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THE SOUTHERN AGRICULTURIST.

(NEW SERIES.)

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For the Southern Agriculturist.

NOTES AND REFLECTIONS ON SOILS, AND THEIR IMPROVEMENT;

BY A SOUTHERNER.

NO. I.

VEGETABLES, like animals, derive their nourishment from the products of organization; but while the multifarious wants of the higher orders of animals impel them to rove the earth's surface in quest of food, the more humble vegetable, having no faculty of spontaneous motion, is fixed to the soil, from the bosom of which it pumps up, by its infinitude of radicles, a portion of the nourishment necessary for its subsistence, while another portion is imbibed from the circumambient air, by its expanded foliage. The chief organic materials by which both these kingdoms of nature are nourished and sustained, are susceptible of being reduced to a few gaseous elements,—Oxygen, Hydrogen, and Nitrogen—which by combinations amongst themselves, and with other ultimate elements, form numerous proximates, some of which are common constituents of both animals and vegetables, while others are peculiar to one or the other of these.

Of the materials which serve to nourish animals and plants, a part is absorbed into their organs in solution, or in a liquid form, while others are taken up in the gaseous state. Out of these liquids and gases, all the fluid and solid constituents of the individual are elaborated, and the various compounds which they form, after subserving their destined purpose for a definite period, are eliminated by special organs, while their place is supplied by new products of the same kind. But while the delicate and complex organization of animals and vegetables is formed chiefly out of the materials of other organised bodies, it has entering into its composition a due proportion of saline and earthy constituents derived from the mineral kingdom, which subserve important ends in the economy of all living beings. As it is by the study of animal organization in relation to the food upon which it subsists, that we become acquaiuted with the laws of animal nutrition, so, also, to enable us to acquire correct views of the nourishment and growth of vegetables, we must investigate them in reference to the materials out of which their organs are formed. In the prosecution of this inquiry, we have to consider them—1st. In reference to the superficial crust of the earth, in which they are fixed by their numerous diverging roots. 2d. In relation to the atmosphere in

which they rear their branches, and spread their verdant foliage. The first element of the inquiry, therefore, embraces the consideration of soils, as their various constituents—mineral and organic—their origin; the modifications of which they are susceptible; and the changes they undergo in becoming subservient to the support of vegetable life. This subject is not only interesting as a branch of physiological inquiry, but is deeply important in relation to the science of agriculture, of which, indeed, it constitutes the most essential element.

1. *Of Soils.*—The superficial crust of the earth's surface, to which the term soil is applied, is almost infinitely diversified, as regards composition, moisture, dryness, cohesiveness, and fertility, according to the influences modifying its formation, and the physical and chemical changes perpetually going on in its different parts. In examining the character of soils, however, all their constituents may be referred to two heads:—1st. The mineral substances, which form their substratum, or primary elements;—and 2d. The organic materials which have been superadded, and upon which their fertility mainly depends.

A careful investigation of the external configuration and internal structure of the earth clearly indicates, that its different strata have been formed at different and remote periods, and that all of them have been extensively disturbed in their relative position, or otherwise modified, either by causes acting with sudden and great violence, or others of slow, but protracted influence. In reference to the periods of their formation and deposition, the materials composing the globe have been grouped under the following heads, or formations:—1st. Primive rocks—including granite, gneiss, and mica slate—with which are often associated hornblend rock, serpentine, crystalline limestone and quartz. 2d. The transition series—comprising argillaucous, or clay slate, graywacke, transition and mountain limestone, porphyry and greenstone, clinkstone and basalt. 3d. The secondary series, under which we have coal, magnesian limestone, red sandstone, lias limestone and clay, grey sandstone and chalk. Some of these are not found in this country. 4th. The tertiary formations, comprising clay, sand, sandstone, limestone, gypsum, marl, &c. 5th. Diluvial and alluvial deposites,—the first comprising blocks of rock and beds of sand and gravel, distributed irregularly over the surface of the earth, and often transported far from the place of their proper origin by the force of an overwhelmning deluge;—the second, deposites of disintegrated rocks, consisting of sand, gravel, broken fragments, mixed with portions of soil, wafted by the currents of rivers from more elevated situations, and spread along their banks and at their mouths.

Incorporated with all their formations, except the primitive, and constituting a considerable proportion of many of them, are vegetable and animal organic remains—the latter consisting chiefly of

the bones of extinct animals, corallines, together with marine and fresh water shells. Besides the natural constituents of the rocks, a great diversity of metals, salines, and other mineral substances, are disseminated through the different formations, and impress upon them important modifications—Thus, under the influence of physical causes, operating through a long series of ages, the solid rocks, composing the crust of the globe, have undergone a process of disintegration and comminuton; their soluble constituents have been taken up by rains, currents, and standing water, to be again deposited in crystalline or other forms; the various organized products partly vegetable, and partly animal, which crowd the earth's surface, by successive decay and dissolution, unceasingly add new depositions; so that in the course of time these have accumulated, and are still accumulating an assemblage of heterogeneous materials, subject to a perpetual play of chemical affinities. In this manner soils are formed, and the due admixture of their several materials, aided by temperature, moisture, light, electrical influences, and the chemical compositions and decompositions constantly going on in their multifarious elements, imparts to them their capacity and fitness to support vegetable life. From them the plant derives its food, while the amount of this pabulum, and the promptness with which it is yielded, are in an exact ratio with the quantity of nutritive elements in the soil, aad the readiness with which they are given up to the organs of the plant. Hence, the importance to the agriculturist of a correct knowledge of the source and properties of this food; of the best means of supplying it when deficient, and of promoting those changes by which it can be fitted, in the shortest possible time, to support vegetation. The investigation of these topics would involve a wide field of inquiry. It would comprise not only all the difficult problems of vegetable physiology, but likewise an accurate determination of all the properties of the various constituents of soils, and the never ceasing changes which they experience under physical and chemical influences. For these reasons, I shall confine my present remarks to a few reflections upon the organic constituents of soils, reserving the other elements of the inquiry for a future occasion.

The organic constituents of all soils are of course derived exclusively, from the products of vegetable and animal life, which have either accumulated accidentally, or been added to them by the arts and industry of man. Of these materials, as they are found in soils, a part are insoluble, while another portion is already in solution, or in a condition at least, to admit of being readily dissolved, when acted upon by the requisite degree of heat and moisture. It is only in the latter state that they are capable of furnishing food to plants, the insoluble portion being altogether incompetent to subserve this important end, until reduced to a soluble condition by favorable influences.

If we submit these vegetable constituents of soils to a careful chemical examination, we shall find them distinguished by their properties, into three leading forms; and for the sake of description we shall designate the aggregate by the appellation *Humus*,—using this as a generic term—under which may be ranged the three forms or varieties as follows:—1. *Extract of Humus*; 2. *Geine*, or *Humine*; and 3. *Carbonaceous Humus*.—The first is soluble in water. The second, according to Berzelius, is a peculiar substance, analagous to Apothegm. It forms the predominant constituent of Humus, and its properties will be particularly described presently. The third is insoluble in water, alcohol, alkalies and acids. It will be proper to notice each of these materials separately, after which, I shall indicate their individual relations, and endeavor to deduce some general principles applicable to vegetable physiology and the science of agriculture.

1.—*Extract of Humus.*

This substance, according to Berzelius, may be readily obtained by macerating the vegetable matter of soils in cold water. It is of a yellowish color, and when the solution is evaporated, it leaves a yellow extract of a bitter taste, from which geine is separated if the extract be re-dissolved. This extractive matter is often held in solution by the waters, rivers, lakes, and springs, and is deposited on exposure and by evaporation, frequently forming a sediment at the bottom, or a pellicle on the surface, still more discolored in many instances, by the addition of peroxide or iron. It was no doubt, owing to the agency of this extract of humus in a state of solution, aided probably by the presence of geine, that in the numerous experiments which were formerly adduced to prove that pure water was capable of furnishing all the necessary food to support vegetable life, plants were found to flourish in this fluid. As therefore it exists in soils, where it is readily dissolved by rain and dew, its importance in agriculture is unquestionable.

2.—*Humine, or Geine,*

Before I proceed to describe the properties of this peculiar substance, so important in promoting and sustaining the growth of plants, it may be useful to make a few remarks upon its chemical history.

Many years ago, it was supposed by chemists, that the extractive matter obtained from vegetable substances in soils, while undergoing decay, was identical in its properties with a peculiar greenish viscous substance, which exists in the bark of the *Ulmus campestris*, or common elm, and some other trees, to which Thomson long since applied the term *ulmine*. Braconnot, at a later period, applied the same appellation to a substance, analagous to apothegm, which he obtained by the aid of hydrate of potash, from saw-dust and soot. Subsequent investigations having proved, that the various

substances thus described under one name, possess very dissimilar properties, Berzelius has very properly proposed to reject the term *ulmine* entirely, and to apply to the substance analagous to apothegm, found in soils, the term geine, with which the appellation humine, may be considered synonymous—as also the terms humic acid, applied by Döbereiner and Sprengel, to the same substance.

Great difficulties are encountered in studying the properties of geine, from the fact, that it mostly exists in a state of combination with other bodies, from which it is not easily separated. It has been stated above, that the soluble extract of humus, dissolved in water, deposites geine. This vegetable extract s called by Dr. Dana, soluble geine.* But pure geine "is but slightly soluble in water, to which it imparts a pale yellow color, less soluble in alcahol, and not at all in ether." When the watery solution is evaporated, it leaves first, a gelatinous substance, which on drying, presents a dark brown color, and is devoid of taste or smell. It has neither an acid nor alkaline reaction, consequently does not affect the color of test paper; but if an acid be added to a combination of geine with a base, the excess of acid combines with the geine, and the product acquires acid properties, manifested by its faculty of reddening tournsol paper. Exposed to fire, it burns at first with a flame, finally without, like starch, and exhales an odour analagous to that of peat in a state of combustion. Its most remarkable property is the facility with which it combines with alkalies, and alkaline earths, and this, as will be presently seen, is its most interesting feature to the agriculturist. These compounds of geine with alkalies, are far more soluble in water than the pure substance, and seem to possess acid properties. Thus, as stated by Berzelius, if an acid be added to an alkaline solution of geine, the latter will be precipitated, and if the acid be in excess, the precipitate will redden tournsol paper. This acid reaction cannot be removed by repeated washing—a proof that is not owing altogether to a free acid, but partly to this, and partly to some modification impressed upon geine by its combination with the alkali.

In this state, Berzelius has proposed to apply to the substance in question, the name of *geic acid*. "It combines with earths, alkalies, and metallic oxides, forming neutral salts, which may be termed geates." † These compounds possess considerable solubility—one part of the geate of magnesia, according to Sprengel, being soluble in one hundred and sixty parts of cold water, while the geate of lime requires two thousand, and the geate of baryta, five thousand two hundred parts of the same fluid. The salts, formed by the combination of geine with alkaline earths, when once perfectly dried, are no longer soluble in water. They are decomposed by the car

* Hitchcock's report on the Economical Geology of Massachusetts, (p. 31.)

† Dana. As above. (p. 31.)

bonated alkalies, which dissolve the geine, and leave the base in the state of a carbonate. When exposed to the air, the base of these geates combines with carbonic acid, and the carbonate which thus results, exists in a state of mixture with a combination of geine with an analagous base, which latter is, under such circumstances, converted into the state of a *supergeate*—always more soluble than the neutral geates.

Geine has not yet been analysed with sufficient accuracy to afford a true indication of the proportion of its ultimate elements. Submitted to distillution, it is decomposed; furnishes half its weight of carbon endowed with a metallic lustre; an empyreumatic oil; acidulated water containing acetic acid—sometimes ammonia, carburetted hydrogen gas, and sometimes a small quantity of carbonic acid gas.* According to the investigations of Boullay, Junr. geine is composed of 56-7 parts of carbon, and 43-3 parts of oxygen and hydrogen in the proportion in which they form water. Sprengel, obtained 58-0 carbon; 2-1 hydrogen; and 39-9 oxygen. It is generally conceded however, that these numbers cannot be received as accurate representations of the composition of geine. The results of distillation, indeed, at once falsify them, since by this process, geine furnishes, as stated above, one half its weight of carbon, while other portions of the same substance are obviously united with oxygen and hydrogen, to form carbonic acid, and carburetted hydrogen, thus clearly indicating, that geine is highly carbonaceous —much more so than is represented by the analysis of either Boullay or Sprengel, and that to this chiefly, it owes its great power of furnishing food to plants.

3.—*Carbonaceous Humus. Carbonaceous Mould.*

Besides the two constituents of soils mentioned above, as being of vegetable origin, there is a third, of a brown—almost black color —highly carbonaceous, totally insoluble, even in alkaline solutions. This is called by Berzelius carbonaceous mould. I have denominated it *carbonaceous humus.* It seems to be the product of an advanced stage of vegetable decomposition, and forms a useful element of soils, although in its natural condition, it is insoluble. It burns, when thrown into the fire, without flame, resembling starch in this particular. According to DeSaussure, it transforms the oxygen of the atmosphere into carbonic acid, and when exposed for a long time to air and moisture, it gradually becomes soluble in alkalies, from which solutions, acids precipitate it in form of geic acid. Braconnot found that it was converted by nitric acid, into a brownish liquid, from which a chocolate colored precipitate was thrown down by water, possessing all the properties of geic acid, being like it, entirely soluble in alkalies.†

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* Berzelius. Traite de Chimie, Tome, vi, p. 573.

† Berzelius. Loc. Cit. p. 579.

From the tenor of the preceding observations, it is manifest that the vegetable matter existing either naturally in soils, or as an addition made to it by art, with the view of occasioning increased fertility, is always reduced by decomposition to one or the other of the three forms mentioned above, viz: to soluble vegitable extract, geine, or carbonaceous humus. Thus, the successive generations of plants that have sprung up spontaneously through a long series of ages; flourished for one or more seasons upon the surface, and then fallen successively into decay;—the series of crops which have been raised by the hands of man, and suffered to waste in the fields; the straw and litter which he distributes from his barn yards and stables, incorporated with the deposites of his animals; the leaves and trash which he collects from the forests and the shores of the sea; the beds of decayed vegetable matter, either accumulated in peat bogs, or marshes, or those which have been wafted by currents of streams and lakes and accumulated for ages along their borders; constitute an abundant, and widely diffused store of crude vegetable aliment. This, acted upon by heat and moisture; modified by chemical affinities and influenced by electrical changes taking place in the particles composing the crust of the earth, is gradually elaborated and refined, so as to acquire a fitness to be absorbed readily by the delicate spongioles existing so abundantly in the radicles of plants, to be afterwards prepared by further refinement, while circulating through the numerous sap-vessels and cells, for the nourishment and growth of vegetables. However heterogenious these materials, when submitted to these influences, they are all reduced, in the end, to one or more of the conditions detailed above; and as soluble vegetable extract, and carbonaceus humus, are convertible into geine, this last may be regarded as the ultimate product of all these natural processes. Thus, soluble vegetable extract, furnishes geine on exposure. So does the carbonaceous humus, or vegetable mould, when acted on by the various agents to which it is exposed. Geine, therefore, which is the essential food of plants, is the natural product of their decay; and this substance, which in its natural state is nearly insoluble, combines readily, in consequence of its affinities, with alkalies, alkaline earths, clay, metallic oxides, &c., which it meets in soils, and thus forms salts readily soluble, and capable of being absorbed by the spongioles of the roots of plants, thus rendering the soil more or less fertile, in proportion to their abundence. Without the agency of this material, there can be no fertility. All nature would present but a bare and barren waste. Plants, it is true, might grow for a time, but they could never mature their flowers and fruit. Without geine, these efforts to grow would prove mere abortious, and when this material has become exhausted, fertility can only be restored by furnishing an adequate supply. The earthy and saline constituents of soils may

exist in the most favorable proportions possible, yet without geine, their agency would prove altogether inadequate to support vegetable life. How important, then, to the Agriculturist is a correct knowledge of the Chemical constitution of the soil he cultivates.—How indispensible an acquaintance with the properties of geine and its compounds, as well as the means of supplying it when deficient, to enable him to apply the requisite ameliorating processes, and thus, while he prevents barrenness on the one hand, he acquires additional treasures on the other, as a reward of his labours, by increasing fertility, and adopting a more judicious, system of culture.

Having laid down these general principles, it yet remains to make an application of them to the management of different kinds of soils. In doing this I shall pass over those ameliorating processes which consist in the addition of some one of the mineral or earthy constituents of a soil, where such an one is deficient or absent, and confine my remarks to those points which have reference to the vegetable matters alone.

1. *A soil may be unproduotive even when there is a redundance of vegetable matter present.* The reason of this is; (supposing the mineral constituents, moisture, cohesiveness, &c. to be in just proportion,) either that the vegetable fibre is not yet sufficiently decomposed, or that it has not yet been converted into geine, in sufficient quantity to supply the wants of plants. Now what is the remedy? Alkalies, and alkaline earths, hasten the decomposition of vegetable matter; so do, also, in all probability, some of the peroxides of the metals, especially the peroxide of iron (perhaps indirectly.)—The same substances likewise form salts with geine, which are soluble, thus converting this substance from a state of insolubility, into one in which it is ready prepared for the purposes of vegetable nutrition. If, therefore, ashes, (or the salts which they contain,) lime, magnesia, and even clay, as it contains usually sulphuret and peroxide of iron be added, both the defects, upon which the want of fertility depends, will be remedied: —the vegetable fibre will be rapidly decomposed; geine will be produced in great quantity; geate of potassa, of lime or of magnesia, according to the substance employed, will be produced; and a rich store of food for plants being thus furnished, the agriculturist will reap a luxuriant and bountiful harvest, as a reward for his labors. Much of the land formed by alluvial deposite along the banks of rivers—many swamps, marshes, peat-bogs, &c. are in this condition; and such soils, other circumstances being favorable, can almost always be rendered fertile by these means of amelioration.

2. *A soil may be naturally sterile, from a deficiency of vegetable matter, or may have become so from the exhaustion of this substance by long injudicious culture.*—Here the fault is the absence of geine. The remedy is to supply this substance. This may be done in se-

veral ways. The defect may be remedied by rest, during which the successive crops of weeds, grasses, &c., which spring up spontaneously from the soil, accumulate and decay upon its surface, thus in process of time furnishing a supply of vegetable matter, which by a series of changes is converted into geine. The same end may be gained by ploughing in green crops. Successive supplies of vegetable matter being thus turned into the soil, it is there acted upon by heat, moisture and chemical affinities, and is converted into geine and its soluble compounds. A more effectual means than either of these, consists in the addition of manures, which are composed of substances partly animal, and partly vegetable—the latter consisting either of the indigested parts of the food of animals, or the vegetable matter added to them in the compost heap, or otherwise; the former is derived from their secretions. The vegetable matter is rapidly decomposed and converted into geine, while the ammonia, soda, lime, and other salts, which abound in most of the animal secretions, combine with the geine, forming geates of ammonia, of soda, of lime, &c., which being soluble salts, are readily absorbed by plants, and speedily convert a state of utter barrenness, into one of astonishing fertility.

These principles enable us to appreciate, at their just value, the protracted disputes about the comparative advantages of fermented and unfermented manures, or of short and long *muck*. It is obvious, that when manures are thoroughly rotted before they are turned into the soil, exposed as they generally are to the sun and drenching rains, a large proportion of the salts of geine which may have formed, must be lost, and the ammonical gas, which is so abundantly generated during the process of fermentation, passes away without combining with this agent of fertility. On the other hand, if long manure be employed for a crop which must start quickly, and grow rapidly, the changes in its constituents, which are necessary to convert them into soluble geates, cannot take place with sufficient promptitude to supply the wants of the plants. This is found to be the case with the cucurbitaci, and some other plants. But when these objections do not hold, and where there are no defects referrable to temperature, to want of the faculty of retaining moisture, &c., long manure is obviously the most appropriate, as it furnishes the greatest amount of fertilizing principles.

There is another advantage in the use of long manure:—during its fermentation, carbonic acid gas is generated in great abundance. This not only contributes largely to vegetate nutrition, by furnishing them with carbon, the oxygen with which this is combined being thrown off by the leaves of the plant,—but also by combining with the salts of geine, converting them into supergeates, which are more soluble than the simple salts. It is manifest, therefore, as a general rule, that the sooner manures are turned into the soil, the greater will be the amount of benefit derived from them, since

by neglecting to do this, they not only lose a portion of their geine, but also become deprived of other agents of fertility.

3. *The fertility of a soil is not always in relation with the amount of manure added to it.*—It is a common remark amongst farmers, that a soil may be ruined by "glutting it with manure." This is a fact founded upon observation, yet few of those who make the remark, understand the reason. It has been stated above, that some soils, in which vegetable matter abounds, are devoid of fertility, because of the absence of those influences by which this substance is converted into geine. The same explanation will, to a certain extent, apply to those cases in which soils are injured by adding too much manure. Here the remedy is the same as in the preceding case. The object is to promote the rapid decomposition of the vegetable matter contained in the manure, and to favour its conversion into geine. This can be done by adding ashes, lime, marl, clay, and other substances which are known to facilitate these changes. But there are other reasons why too much manure may prove injurious to soils. Thus, if long unfermented manure be added in large quantities, to light arid soils, especially if the season be a dry one, they do not possess sufficient capacity for moisture, consequently the crop will suffer, as well from the absence of this element of fertility, as from a deficiency of geine, which cannot of course be generated in adequate quantity under these inauspicious circumstances. Where this mistake has been made, the error may be remedied by adding ashes, lime, &c., because these substances speedily decompose the manure, and convert it into geine, which, as will be shown presently, possesses an extraordinary capacity for moisture Hence the explanation of a very common phenomenon:—the manifest preponderance of moisture in a portion of soil to which lime or ashes has been applied, while another portion of the same kind, to which these additions have not been made, remains dry and parched. Another reason why too much manure sometimes proves injurious to some soils, is, that during fermentation under the surface, too much heat is evolved, or as is more frequently the case, those salts, which in moderate quantities, are fertilizing, are here generated so abundantly, as to prove poisonous to vegetable life. Hence the common remark, that plants upon such a soil, are "burnt up" by the manure. This is more particularly observed during the hot dry months of summer.

5. *Lime, ashes,—in short all the alkalies and alkaline earths, including of course, calcareous marl, promote fertitity as long as the soil contains vegetable matter, but lose this property as soon as this material is exhausted.*—This is a most important corrollary. For a long time agriculturists indulged in vain speculations relative to the manner in which these substances act in promoting fertility. By many, it was supposed they merely act as condiments, stimulating the vital energies of plants. Others attributed their beneficial

influence to their property of attracting moisture from the atmosphere, and retaining it about the roots of the plant; while some correctly inferred, that they hasten the decomposition of vegetable matter, but they could not explain the nature of the products. The relations of these substances for geine, and the compounds formed by their union with it, furnish a satisfactory solution of the problem. As long as vegetable matter exists abundantly in the soil, upon which these alkaline agents can act, to convert it into geine and its compounds, they may be added with a certainty of promoting fertility. But as they hasten the changes by which these products are generated, they of necessity exhaust the store of vegetable matter sooner than it would be exhausted under the influence of those agents which act upon it, in the absence of such decomposers.—Hence, while for the time, alkalies and alkaline earths, render some soils more fertile, if too lavishly employed, they will inevitably induce a premature state of utter sterility, unless vegetable matter be also added in a corresponding ratio. For the same reason it is obviously absurd, to expect to impart fertility to soils which are already barren from a deficiency of vegetable matter, by adding lime, ashes, marl, &c.

5. *The capacity of "vegetable mould" for moisture, is in a ratio with the amount of geine it contains.*—Thus, it is stated by Berzelius, that vegetable mould is capable of combining with one fourth its weight of water, without exhibiting any appearance of humidity, and like charcoal, it attracts moisture from the atmosphere. It owes this property to its geine, which is one of the most energetically hygrometric of all known bodies. Carbonaceous humus is capable of absorbing double its weight of water without acquiring any appearance of humidity, and after dessication, will attract from the atmosphere, in less than twenty-four hours, an amount of water varying from eighty to one hundred per cent of its weight, according to the hygrometric condition of the air at the time. This faculty depends partly upon the light and pulverulent condition of the carbonaceous matter—partly upon the geine it contains.* Hence, while geine serves as the immediate food for plants, in virtue of its extraordinary hygrometric properties, it attracts moisture from the atmosphere in dry seasons, and retains it in the soil, where being constantly in relation with the roots of plants, it acts as a solvent of the geine, while at the same time, it tends to maintain the sporules of the roots in a condition to absorb the liquid aliment provided for them.

6. *Geine may fail to impart fertility to a soil, in consequence of its existing in a state of combination with some acid, or in consequence of the existence of a free acid in the soil.*—Such soils are appropriately called acid, either because they bring forth spontaneously acid plants, as the *Rumex acetosella*, or because they merely support a

* Traite de Chimie. Tome vi. p. 581.

stinted vegetation, consisting of various species of hyprnum, sphagnum, and other mosses, the remains of which yield an acid on distillation. They are generally cold, humid, and sterile, as we observe is the case with many marshes and peat bogs. It is on account of these acid properties, that peat, although consisting mainly of decomposed vegetable matter, is totally devoid of fertilizing influence, until its acidity has been corrected by the addition of proper neutralizers. The same is true to a great extent of mud collected from common fresh-water swamps. I once knew the soil of a very fine garden rendered almost sterile for a whole year, by having a quantity of this material spread over its surface.

The acids most frequently found in such soils, are, the acetic, the phosphoric, and according to De Pontin, also the malic. If peaty, and other acid soils, be carefully examined, they will be found to redden tournsol paper, and many of them when submitted to distillation in the dry way, or mixed with water, yield a fluid containing manifest traces of acetate of ammonia.

Whichever of these acids be present, the effect is detrimental by the acid combining with those bases, which, when united with geine, form the principal fertilizing salts, or geates. To remedy this, ashes, potash, soda, lime, or calcereous marl, must be added in sufficient quantity, not only to nutralize the free acids in the soil, but also to furnish bases, which when united with insoluble geine, will render it soluble.

I have reason to believe, that much of our land in the lower part of this State is rendered unproductive by these acid properties.—There are many consisting almost entirely of a loose black, or snuff colored, mould, which with all these apparent characters of fertility, scarcely produce any thing but a growth of sphagnum, rumex, juncus, and various species of cyperus, which I doubt not, by proper drainage, and a free addition of lime, marl, or ashes, might be rendered highly productive. In reference to this subject, I must not omit to mention a remark of Commissioner Coleman, in his second report on the Agriculture of Massachusetts. He says, "in Otis, ashes on moist land have proved unfavorable; and repeated have occasioned moss and barrenness." He suggests as a reason of this, that as the ashes applied to wet land becomes immediately dissolved and active, is it not the case that the vegetable is furnished in quantities, which the plants cannot take up, being filled to repletion; or passes off in its dissolved state immediately into the subsoil? Granting the justness of this explanation, I would add another:—the soil already redundantly moist, is rendered still more so by the great amount of geine generated out of its vegetable matter, which from its great hygrometric properties, attracts and retains still more humidity, and thus renders the land too wet for productiveness. If this be true, a thorough system of drainage and subsoil ploughing would obviate all the difficulties, and render such soils highly fertile.

Now, gentle reader, if you have followed me patiently through these reflections, I would fain hope, that if you have any love of agriculture, I may have said something to incite you to inquire into the relations of chemistry with this—the noblest of all sciences—Chemistry has achieved much to illustrate and improve its processes, but much yet remains to be done. There is yet a veil of darkness spread about many points of vegetable economy and the arts of tillage. Let me conjure you then, to come forth from your retreat, to lend us your aid in lifting this veil. Do not, like "meek eyed patience, fold your arms in despair," or do like the man, who affirmed "that he was waiting for the science of chemistry to come to a stop, before he engaged in the study." Accompany me into the woods and the fields. Let us delve together into some of Nature's hidden mysteries, and should any gleanings be culled in our rambles, they will be duly proclaimed by

A SOUTHERNER.

EXPERIMENTS ON THE IMPROVEMENT OF POOR LANDS BY SUBSOIL PLOUGHING, BOTH WITH AND WITHOUT UNDERDRAINING.

BY THE REV. W. L. RHAM, VICAR OF WINKFIELD.

To the Secretary of the English Agricultural Society:—

Sir,—As it is of more importance to the progress of agriculture to have well authenticated facts and accurate details of different modes of cultivation, than mere theoretical speculations, I venture to lay before the English Agricultural Society the result of two experiments, made with considerable attention to every circumstance which might influence the result.

1 The first which I shall mention may be found interesting at this moment in consequence of its throwing some light on the use of the subsoil plough, which, although by no means a new invention, has lately been strongly recommended on particular soils, not without some discussions as to its merits, and doubts of its general usefulness.

The field which was the subject of the experiment was once a portion of the open common in the forest of Windsor, and brought into cultivation soon after the inclosure of the forest in 1813. Its soil consisted of a very moderate loam, inclined to yellow clay, only a few inches in depth; the subsoil chiefly a stiff clay, but with occasional portions of a very gravelly loam, nearly impervious to water. The surface is slightly undulated, and sufficiently inclined to let off the surface water by means of open drains. It was first brought into cultivation by paring and burning the surface; and no very regular rotation of crops was followed. The first crop was turnips, broadcast; a very good crop, in consequence of the ashes. After this had been fed off by sheep, came oats; a good crop. It

was then chalked, at the rate of about fifteen tumbrel loads to the acre, and manured with good dung, six tumbrels per acre. After this, part of the field was planted with potatoes, part with beans, and part with peas, as experiments; the crops were moderate.—The next crops were half wheat and half oats; fair crops—about three and a half quarters of wheat and between five and six quarters of oats per acre. A similar course was pursued, with variations, till within a few years when rye-grass and clover were sown with the last crop. The grasses were mown twice for hay the next year. The two next years the field was pastured chiefly with sheep.

This I consider to have completed the preparatory cultivation; and the field, when broken up, showed a manifest improvement in the dept, color, and texture of the soil. After that it bore beans and wheat. It was then fallowed, in order to clear it of the coarse natural grasses which, in spite of all this cultivation, had not been entirely eradicated, and also of a considerable portion of couch grass *(Triticum repens,)* which had increased in the soil. Six acres of the field were subsoil-ploughed, early in 1838, to the depth of fourteen or fifteen inches, by means of the Rackheath-plough, made by Messrs. Ransome & Co., at Ipswich. A common swing-plough (the only plough I ever use,) with two horses abreast, first made a furrow of about six inches deep. Not having a large team, I had several such furrows opened, and then the two horses, and two more who had been carting manure while the other pair was ploughing, were yoked to the Rackaheath plough, which stirred the subsoil nine or ten inches deep. The common plough after that filled up the furrows. Thus somewhat less than half an acre a day was subsoil-ploughed with four horses, the weather being very favorable. The land was now manured with ten cartloads of yard dung to the acre: one acre was planted with potatoes; in another acre, mangel-wurtzel seed was drilled in rows eighteen inches apart; two acres were sown with Swedish turnips, and two acres with red tankard turnips.—The mangel-wurtzel was either taken off early by the fly, or failed; and turnip seed was drilled over it. The Swedes were also sown a second time. Before Christmas there was a very good appearance of Swedes and turnips, which had been properly hoed two or three times and were clean. I congratulated myself on the result of the experiment, and began to feed off the turnips with sheep, drawing a portion for the cows at home. The winter was wet, and I was soon obliged to remove the sheep. The ground became too hollow to bear the cart wheels and the tread of the horses; and I began to regret having loosened the subsoil, which now held wet like a sponge. I had never thought that the field required underdraining. The water always ran off by the open drains before it was subsoil ploughed; I might therefore, very naturally have concluded that the subsoil plough had now ruined my lands. The turnips were now eaten off or carted home

till late in spring; and perhaps I should have lost the use of them altogether, or spoiled my land by cutting it up, if I had not determined on an effectual remedy.

I immediately ordered eighteen thousand draining tiles, which fortunately I procured from different kilns in the neighborhood; they were the footed tiles. The common size cost two guineas a thousand, besides carriage; they were thirteen inches long; these for the main drains cost three guineas a thousand, six inches in diameter, but only twelve inches long. I laid out the drains thirty feet apart; the common drains twenty-six inches deep, the main drains thirty inches. An immense volume of water ran out of the drains before the tiles we put in; and in a short time after they were filled up, my sheep returned to the fold, and my cart took the daily supply of turnips for the cows. The whole field was underdrained at a cost of fifty pounds besides the carriage of the tiles, that is only five pounds per acre. Of the six acres which had been subsoil ploughed, two were drilled with Chevalier barley and four with Tartarian oats. Red and white clover, rye grass, and other grass seeds, were sown after the land had been harrowed, and the surface was rolled. The season being moist, the clover grew very rapidly, and the barley suffered in consequence. The crop notwithstanding, was fair, reckoned at about four and a half quarters to the acre; which is more than is usually grown in the neighborhood. Had there been no clover, six quarters might have been fairly expected from the length of the straw and ears. The Tartarian oats kept down the clover. The straw rose above a man's head, and the crop was very heavy. It is not threshed out, but we estimate it at about nine quarts to the acre. From the yield of a small portion threshed, I have reason to think it will exceed this. The field is now (Dec. 21st,) after all the rain which has fallen in autumn, as dry and sound as any pasture I have. My cows and horses have been occasionally turned into the field without making any impression; and the old water furrows, which were dug out by my men, from habit, are quite dry, with fine clover in the bottom of them.

The conclusion to be drawn from this experiment is important, as it shows that, wherever the subsoil is retentive of moisture, complete under-draining is essential; and that the subsoil plough should never be used until the water can run off below. It also shows what an improvement is made on moderate land by the union of draining and subsoil ploughing. The cost is nothing when compared to the result. The fifty pounds I laid out on this field, I consider as the most profitable investment I ever made. The four acres which were not subsoil ploughed are in artificial grass: as soon as the field is again broken up, which will be in two or three years, this portion shall also have the benefit of the subsoil plough.

[The other experiment will be given in our next.]

LIME.

"WERE lime a manure, it would be a noble substance for enriching and restoring fertility to lands worn out by a succession of crops; but, as worn out land is not restored to fertility by the application of lime, we are warranted to consider it in a different light; or, in other words, as an article to bring certain principles into action, previously possessed by the soil. This conclusion is sanctioned by experience; and experience is a far better guide than the most plausible theory."—*Morton on Soils.*

We think this short extract has, in very few words, set right a matter of great importance to the farmer, and corrected an error which is prevalent, not only in Great Britain, but also to a considerable extent in this country, viz: that lime will restore to fertility all lands that have been exhausted by cropping. But lime is not a manure, in the sense in which animal and vegetable matter is —it is not nutritive itself, it only assists in nutrition; and however important the part it acts in this way unless nutritive matter is existing in the soil, ready to be appropriated to the use of plants, the application of lime is entirely useless, so far as the restoration to fertility is concerned. Every one can see, that when all the vegetable and animal matter has been exhausted in a soil, by ceaseless cropping, and nothing but the primitive earths, silex, alumine, lime, magnesia, &c. of which it is composed, remaining, that the application of more of any one of these primitive earths, will add nothing to its fertility or capability of producing vegetation.

If, on the contrary, there is vegetable or nutritive matter in the soil, lying dormant for want of exciting agents, or in an insoluble state, and therefore inaccessible to vegetation, an application of lime by removing one or both the causes, may render the most essential aid to the farmer, in the production of his crops. A neglect of this important fact has led to serious error in the use of lime in England, and in this country. Because, in some cases lime has produced the best effects, it was at once expected in all; and because, where nutritive matter existed to be called into action by the lime, a great increase of the crops were the result, it was supposed that this effect could be renewed at pleasure; and liming without manuring, become at once the order of the day. As must have been expected, a failure in the crops, in such cases, has been the result; and a prejudice against the use of lime, resulting from its application on false principles, has succeeded the most unbounded confidence in its favor.

Lime is a noble substance—it cannot be dispensed with in soils, but like the other earths it is powerless alone. The man who eats curry or cayenne with his roast beef, does not expect his nourishment from them—they are only the accessories, the stimulating agents. The farmer who has just views on the subject of vegeta-

ble nutrition, does not expect his plants to subsist on the lime, salt or gypsum he furnishes them; nor does he expect that these stimulants of them, without the application, in some form, of vegetable or animal matter of which the plants can avail themselves, will restore fertility to exhausted soils, or continue it in such as now possess it. No farmer should forgret that no single substance can ensure fertility; not one of the earths or one of the stimulating or nutritive manures, can do this; the presence of all is necessary—and the best proportions ensure the greatest productiveness in any soil.—*Albany Cultivator.*

SIMPLE OPERATION OF TILLAGE.

1. *Ploughing.*

In ploughing, a slice of earth is to be cut from the left hand side, and to be turned over to the right hand side. In this operation the left hand or near side horse walks on the ground not yet ploughed; the right hand or off side horse walks in the furrow last made, and the workman follows, holding the handles of the plough.

By means of these handles he guides the plough, while he directs the animals of drought by the voice and the reins. When he is to turn the plough at the end of a furrow, or when it encounters an obstacle, such as a large stone, he presses down the handles, so that the heel of the plough becomes a fulcrum, and the share is raised out of the ground.

As the perfection of good ploughing can only be attained by *practice*, it must be evident that nothing like a system can be framed for the operation on every diversity of soil. The following rules, partly those of that eminent agriculturist, the late Mr. Finlayson, who was himself an expert practical ploughman, may be laid down as worthy of being observed by every man who intends to become a proficient in the performance of his work.

The horses should be harnessed as near to the ploughes they can be placed without impeding the freedom of the step—for the closer they are to the point of the draught, the less exertion will be required to overcome the resistance.

When ploughing with a pair abreast, the most forward and powerful horse should be worked in the furrow. But if the team be harnessed in line, and there be any difference in the height of the cattle, the tallest should be put foremost, if he be in every other respect equal to the other.

When at work, they should be kept at as regular and good a pace as the nature of the work may permit; for they are then more manageable, and the draft easier than when slow. By due attention to this, the heavy soil will also cling less to the coulter, and the land will be found to work more freely.

The breadth and depth of the furrow being ascertained, the plough should be held upright, bearing equally all along on a straight sole, and be made to move forward in a regular line, without swerving to either side. The edge of the coulter should also be set directly forward, so that the land side of it may run on a parallel line with the land side of the head, and in such a position that their slant, or sweep, may exactly correspond.

The ploughman should walk with his body as nearly as possible upright, without leaning on the stilts or handles, and without using force to any part, further than may be absolutely necessary to keep the implement steadily in a direct line. He should also be sparing of his voice and of correction to the team—of the former, because too much cheering and ordering only confuses the cattle—and of the latter, because punishment, when often repeated, at length ceases to have due effect, and thus leads to unnecessary beating. These are the rules or principles laid down by Mr. Finlayson and others.

It must be apparent that, as every kind of soil has its appropriate qualities, each requires a peculiar mode of tillage. Ploughing, which is the chief operation, ought therefore to be executed according to the nature of the land, and not performed upon any one invariable principle.

On strong clays and loams, and other soils of a deep or rich staple, the plough should go to a considerable depth; whereas, on thin clays and sands, the benefit of deep ploughing is very questionable, especially when incumbent on a sterile sub-soil. On each description of land, distinct modes of operation, and implements of different construction, are therefore absolutely necessary.

Very opposite opinions are entertained by many eminent farmers regarding the proper *depth of ploughing*. But as yet, the application of deep or shallow tillage, to various soils respectively, has not been ascertained upon any settled principle.

The proper depth of ploughing must necessarily depend upon the nature of the soil; but although every intelligent husbandman must be aware of the superiority of those of a deep staple over those which are shallow, still it should be borne in mind that there is a wide difference between the effects of ploughing deeply into land, the vegetable stratum of which is of nearly equal fertility throughout, and that of augmenting a shallow surface of fertile soil, by mixing it up with a sub-soil of inferior quality.

Soils of the very best quality, may be completely exhausted in the course of a few years, by *shallow ploughing;* so on the other hand, soils of an inferior quality, by a judicious system of ploughing, as has already been remarked, may be greatly improved in the staple. This course is recommended to increase the depth of the soil of uplands.

Considerable diversity of opinion prevails among practical and scientific farmers, as to the best *mode of ploughing*. Until within

a few years, it was the universal practice, with perhaps an occasional exception, to throw the furrow at an angle of about 45° (degrees.)

The advocates of the *level* system of ploughing, are, however, increasing. We do not say that this method is preferable to *ridge* ploughing on *all* occasions; very stiff and wet lands may form an exception; but it appears to us reasonable that this process leaves the land in the best form for the after tillage, and by covering all stubble and green crop completely under, and leaving the surface level, light and friable, fits it for the production of good crops, requiring less strength of team to draw the plough, and less effort of the ploughman to govern it.

William Buckminster, an eminent farmer near Boston, Massachusetts, thus spake of the latter method.—"The best ploughing is that which most completely subverts the soil and buries beneath it the entire vegeteble growth. To effect this a good plough is indispensable. Rough and stony ground may indeed be rooted up by the short rooter plough. Such lands are usually cross-ploughed before planting. Plain fields require a different instrument; a much longer plough is wanted here, to turn the furrow flat without breaking, and without the aid of the ploughman's foot. Such an instrument runs easier than a short one, because it enters the earth more gradually, as a thin wedge opens wood more easily than a thick one. The furrow rises less suddenly on the inclined plain of the mould board, and falls where it should do, in the bed of the preceding furrow, and completely fills it. To make sure work, the coulter or cutter should not stand perpendicular, but should lean to the right, being placed a little anglewise in the beam for this purpose, and cutting the edge of the furrow slice in a bevil form, it will then shut in like a trap door. Let not my brother farmers be alarmed lest their lands should be turned too flat! If they wish to see them lie edge up, or shingled, one furrow upon another, or broken into short junks, they can use a short rooter or a post, as the Africans do. 'But,' say they, 'the *soil should be light.*' Newly ploughed greensward always lies too light the first summer and requires thorough rolling and harrowing, to prevent its suffering for want of moisture; for unless the particles of earth, &c. come in contact, capillary attraction ceases and the turned sod draws no moisture from the sub-soil. Hence our crops, in a dry season, suffer more on greensward than on old ground.

"There is no danger in laying the greensward furrow too flat, if turned, as it always should be, when the grass is green; that and the roots soon begin to decay, and in our summer months your horses will break through the sod in passing, and demonstrate to you that the furrow does not lie close enough.

"The advantages arising from this mode are, we cover up and set to fermenting the whole mass of vegetable matter that covered

the soil—we destroy all the noxious weeds—we render the surface smooth and much more easy to manage, and we avoid making loose and broken sods in sending down to grass—for the furrow thus laid flat should never be disturbed till a new breaking up after a course of grass crops. If seeded down to grass in this state it will not lie so heavy, and will not want to be disturbed again so soon as if it had been completely pulverised before seeding.—Ploughs for our plains should, therefore, be made long---they run more steady and cut the furrows more true; and it is not green-sward only that should be turned flat---stubble land, weedy lands, and cornhills, should be turned flat, and only once till the matter turned underneath is decomposed. In preparing corn land for spring sowing, therefore, a heavy harrow should be first used.---Make the surface as level as possible with this, then let the plough turn the soil once over and no more before sowing. This furrow may be as fine as you choose, but when once you have turned this mass of stalks, of weeds, and grass underneath, it is absurd to disturb it during the same week or month---we do much injury by ploughing too often---we undo our own work."

A practice has long prevailed in almost every country, of forming the ground into what are termed ridges, so as to admit of the water which falls upon its surface, finding a ready egress. This method is deemed necessary in all moist or wet countries; and even in lands so dry that little or no injury will result from stagnating water: such ridges are generally formed on account of their convenience in the different works of tillage.

The direction of ridges must generally be regulated by the sloping of the fields, and the laying of ditches and fences, so that they may promote the main purpose for which they are formed, the carrying off of surface water. But, other circumstances being alike, they should be made to lie as much as possible north and south; and never, when it can be avoided, east and west; for, in the latter case, when the ridges are much elevated, the north side has a somewhat less favourable exposure than the south side.

A very intelligent young farmer of Chester county, J. A., speaking of ploughing, says:---"Ground to be left in a handsome condition after ploughing, should, in all cases, be ploughed in as large lands as possible, for the fewer open furrows left in a field the better ---say in a twelve or sixteen acre field, not more than three or four. If a field is to be ploughed twice in succession, in the same direction, the commencement of the land in the second ploughing should be at the place of finishing them in the first ploughing. This will completely fill the old furrows, and prevent any increase in their number. But if the field is to be ploughed in a direction transverse to the former ploughing, the old furrows should, before commencing it, be filled by ploughing into them about four furrows, that is two rounds. This will keep the land completely level, which is

far preferable to ploughing it in small lands. By ploughing in small lands the field will be thrown up into a great number of ridges, and consequently a corresponding number of hollows. This will not only expose it much more to the action of heavy rains and floods, but it will produce its crops very unevenly, heavy on the ridges, and dwindling in the furrows, but by keeping the surface level and even, the crops will be uniform over the field; nor will it be exposed so much to the danger of being washed into gulleys by heavy rains.

"I would further suggest, that if the field has any declivity, to prevent any action from heavy rains, that the last ploughing given it previous to laying any length of time, be in a direction as near as possible at right angles to the decent of the hill."

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2. *Harrowing.*

The next of the simple operations of tillage, is that of *harrowing*. One man or boy drives a pair of horses and a pair of harrows *— though sometimes one person drives three horses and three harrows. The driver walks behind with long reins, which enables him to guide and urge forward the horses; and he must be ready to lift up with his hand or a crooked stick, which he holds for the purpose, the harrows when they are impeded by roots, weeds or other substances. By lifting up the harrow while in motion, the weeds collected by the teeth fall down.

This process is of essential use in the cnlture of arable lands. By it the soil is more thoroughly pulverised; wet weeds, near the surface, are torn out and collected; and the manure is more intimately mixed with the soil. Harrowing is given in different directions. First in length, then cross, and finally in length as at first.

Besides the clearing of the ground, a purpose in harrowing is to cover the seeds of cultivated plants. The number of harrowings to be given for this end, depends upon the state of the ground and other circumstances. When the surface is matted together by the roots of plants, as in the case of land ploughed when in grass, repeated turns are required to cover the seeds in a proper manner. But when the land is already pulverised, and a small degree of labour is required. Sometimes a single turn will suffice. This is especially the case when the smaller seeds of grains and grasses are sown.

The operation of harrowing is best performed when the land is moderately dry, and in the mornings while the dew is on. When the land is wet, harrowing is as much as possible to be avoided, as well on account of the less efficacy of the operation, as the injury done the ground by the treading of the cattle.

* Formerly, and still in many sections, the single harrow alone is still used.

Harrowing of meadow-lands when they become bound, or cold and mossy is of essential service, and will render them much more productive the following year. The most suitable period is the spring, while the ground is soft. But if the meadow be too wet for spring harrowing, it may be deferred to the drier part of fall. In such cases, a suitable top-dressing before the performance of the operation, would be found highly advantageous.

3. *Rolling.*

THE *Roller* is employed upon the farm to smooth and consolidate the surface of land in crop or grass, and for passing over grounds newly sown with grain, or that are to be laid down to grass. The great importance of the roller has not, heretofore, been properly appreciated by our farmers—but, we are happy to say, it is now coming into very general use.

All grass lands where the frost has, during the preceding winter, raised part of the roots out of the ground, require the roller to be passed over them in the spring, and many persons, whose testimony is entitled to great respect, recommend its use upon all lands in the spring, where grain had been previously sown or corn planted, for the purpose of breaking the clods, preventing injury from extreme dry weather, and causing the grain to be collected in harvest with less difficulty. *

It is of great service in mowing grounds, by pressing the small stones into the ground, which would otherwise interfere with the scythe in mowing, as well as by levelling the weeds. Grain, which has been frozen out during the winter, may be essentially benefitted by passing the roller over it, and thereby bringing the fibres of the roots in contact with the earth again.

The roller may also be used to great advantage on any sod after being ploughed, by making the ground more compact, which will facilitate the decomposition of the sod, and render it less liable to suffer from the effects of drought. In corn ground, in addition to the above, it prevents the furrows from being moved by the cultivator in the dressing of the corn, and places the ground in much finer tilth than it would otherwise be, with the same labour without it.

In rolling grass lands it is necessary to attend, in a particular manner, to the condition of the surface to be rolled—if too wet, the ground will be poached by the cattle's hoofs; and if too dry, little or no impression will be made by the roller in levelling the inequalities.

4. *On Digging.*

THE plough, the harrow, and the roller, are the essential implements of preparatory tillage. To these, however, and the plough

* Farmers' Cabinet, vol. i. page 292.

coulter, may be added the *Spade;* which though properly the instrument of culture in the garden, may be employed occasionally in the field.

Cultivation by the spade however, though more efficient, is greatly more expensive than by the plough. It may sometimes be employed with advantage, though rarely on a great scale, where the profit depends upon economy of labour.—*American Farmer's Institute.*

For the Southern Agriculturist.

RANDOM REFLECTIONS—BY A BOOK FARMER.

READER! do not be alarmed by my cognomen. Although a *book farmer*, I have had some little experience, and if you will bear with me patiently, I will solemnly promise not to say one word about *morus multicaulis*, provided you will not debar me the honorable privilege of speaking of Rohan potatoes and Berkshire pigs—the latter, when genuine, having exactly three white hairs in the tail, as the true emblem of purity. Having made and ratified our compact in due form, let us begin, first, with—

Sugar Beets.

Are you fond of good, rich, sweet milk, and butter? let me advise you to make ready for a crop of sugar beets. Take my word for it, this is no humbug. These roots may not be the best thing in the world, when given alone, to fatten cattle for the shambles, but as food for milch cows, where the object is an abundance of delicious, rich milk, and cream, I know of no species of aliment to be compared to them, especially if they be fed with a due admixture of peas, flour, or bran.

While at the North, as much has been said and written about sugar beets, as upon any of the fashionable *humbugs* of the day, little attention, so far as I know, has been attracted to the subject at the South. This may be owing to our sore recollections of numerous disappointments—perhaps also in part to an overweening attachment to the ways of our great-grand-fathers—a natural consequence of our Rip Van Winkle propensities. We are so fond of our rich Madeira and our slumbers, that while our neighbors are *going-a-head*, we are content to sit down and dream of the past. It some how happened early last spring, that while seated in my arm-chair after dinner, my feet poised upon the table, and dense columns of fragrant smoke rising gracefully from my *Mershiem*, as I quaffed the aroma of the grateful weed, that my reflections turned upon sugar beet. Having early learned that the most valuable kind of wisdom is that which is purchased by experience, I thought to myself it cannot cost much to test the truth of what has been said of this precious root, which according to some, is ere

long, to convert our whole country, if not into an El Dorada, at least into a land of sweets. My anticipations did not run quite so high. It occurred to me that we might be very well contented with a land of mik and butter—more especially, if by such a consummation, we could put into the pockets of our own farmers, the three or four hundred thousand dollars, which now go to New-York annually, to supply the Charlestonians with butter and cheese.*

With these thoughts flitting through my brain, my half exhausted pipe was put aside, and I hurried away to purchase a pound of sugar beet seed. My land, which is a dark sandy loam, had been turned over with a two horse plough in December. It was now manured broad-cast, ploughed again, worked through once with cultivator, and then harrowed. This brought me to the fifteenth of April. Upon one half the ground shallow furrows were run with a plough, two feet and a half a part, in which the seeds were drilled thicker than I designed the plants to stand. Upon the other portion, they were drilled upon the surface, at the same distances. In due time, I had the pleasure to see a fair stand of plants above ground, but while indulging in fond anticipations about the issue of my deeply cherished experiment, the almost unparalleled rainy season of the last year came on, and my ground being naturally low, wet, and inadequately drained, nearly all my plants that had been drilled in the furrow were drowned; the others suffered much in the same way; and the whole crop was so severely injured, that a large proportion of the plants never recovered from the effects of the watery deluge. Notwithstanding this disaster, I determined to persevere with the work, and by keeping my crop as clean as circumstances would admit, I had the satisfaction, by the end of July, and the first of August, to indulge my favorite cow every day, for some time, with a delicious repast of sugar beets, some of which measured from eight to twelve inches in circumference. Many, however, were small and insignificant, yet not the less acceptable to my grateful beast, who as a requital for my kindness to her, rewarded me from day to day, with a rich profusion of the most delicious milk that ever passed my palate, and I have partaken of this grateful fluid in some of the most favored milk countries in the world.

But my troubles were not yet at an end. The wet season continuing, and my land being too low, the tops of my sugar beets decayed prematurely; the tap roots rotted off some distance below the surface of the ground; and my poor cow was deprived of her luxury, before she had consumed one half of the crop.

Now, gentle reader, for the corollaries. Firstly then, sugar beet is no *humbug*, as my cow could testify, were she gifted with the powers of speech. Secondly, they can be easily and advantageously grown near Charleston. Thirdly, I sowed my seed too

*A single house in this city sold butter and cheese, in the course of the past year, to the amount of upwards of ninety thousand dollars.

early for a main crop, and too late for an early crop—it being my humble opinion, that two crops a year can be grown in the vicinity of Charleston. My method of putting in the crop was also bad, and the selection of the soil injudicious – it having been entirely too low and wet Fourthly, and lastly, I intend to profit by the errors of my past experience—would that I could do so in all other matters—and try my hand again, as follows:—

To wit, I propose to make an effort for an early and a late crop. My land has already had a winter ploughing. It was well manured for the last crop; is a loose sandy loam; and is withal sufficiently dry. Early in March, it shall have two deep ploughings—of harrowing quantum sufficit; and all the et ceteras that enter into the recipe for bringing it into good tilth. With a good shovel plough it shall be laid off in furrows, three feet a part. In these furrows, I will scatter a goodly supply of fermented and fine manure, and cover it by turning upon it two other furrows, with a common mould board plough, so that the site of each furrow will present a small ridglet. I will then screw a board, fourteen inches long, with a hole bored through it to receive the bolt, to the foot of my shovel plough stock, and passing it over each ridge, brush it off level and smooth, thus putting it in a condition to receive the seed. This I will drill upon the top of each ridge, having first made a shallow trench with the corner of a hoe, or the end of a rake—then cover it lightly and smoothly; and last of all, if the ground be dry at the time, pass my roller over the ridges, to press the mould down evenly upon the seeds.

About the middle of June, should I be providentially spared, you may find me engaged in the same occupation for my second crop—(Remember I am only speaking of an experiment.) But now I will use the precaution to soak my seed for twenty-four, or forty-eight hours, before I sow them; and should we be blessed with gentle showers about this time, which I greatly fear may not be the case, I will hie me into the field, while the soil is yet moist and congenial, and put my seeds in as aforesaid, it being expressly understood, that my ridges, &c. have been previously made ready.

Having now planted the crop, we must pause until the plants come up. As soon as they have attained a sufficient size, they shall be thinned to stand twelve to fourteen inches in the drill, all other noxious plants that dare intrude being at the same time excommunicated by a gentle scrape of the hoe, or a twitch of the fingers After another season of repose, I will run a small mould board. plough, with the left hand side to the drill, so as to throw off the dirt from the plants into the ally; give the latter a pass with the cultivator; and then follow with the hoes, and mould the plants lightly, by drawing a little of the loose dirt to them from the ally. The dose may be repeated as often as necessary, the rule being always, to have the soil "*well shaken when taken.*"

Now, mon chere ami, what say you to this specimen of my book-farming? Pray go and do likewise. Perhaps you may outstrip me in the success of your experiment. Should you be thus fortunate, your cow will most graciously thank you, and our good friend Legare, who looks with great favor upon all fine cows and Berkshires, will be most happy to publish the results of your experience to the world, for the benefit of the whole race—so here ends the first chapter. What! I think I hear you exclaim—another chapter! Yes, even so—another chapter. We must have a hit at the

Rohans.

Were it not for our compact, I should be disposed to make a passing comparison between Rohan potatoes and the morus multicaulis. Do not be alarmed, I am not quite demented, although you will no doubt think me so, in proposing to compare an Irish potatoe to a mulberry tree—the one only fit to feed hogs—the other furnishing the materials of the most costly vestures of kings and potentates. Now, I only designed to say, that we have been alike *humbugged* a little in relation to both these things—not that they are in any other respects similar. Having thus, as I trust, satisfied you of my compos mentis, here goes for another leaf from my book-farming.

Whether my *mershiem* inspired me or not, I cant exactly determine, but some how or other, in March last, the thought crossed my mind, that I might as well try my hand with the Rohans. Away I went to Landreth's, with my head full of imagination's fairest visions. Surely, thought I to myself, if one Rohan potatoe weighs three pounds, one hundred will weigh exactly three hundred pounds; and as fancy thus revelled from plant to plant, and from row to row, of my future crop, I began absolutely to imagine myself on the high road to fortune. For the very moderate sum of one dollar, I purchased eight Rohan potatoes, out of the offspring of which I expected to achieve so much. Having run a furrow along one border of my potatoe ground, one hundred feet in length, and parallel with a ditch, the preparation was completed by filling the trench with a goodly supply of manure. Each eye of my Rohans was then carefully scooped out, so that from my precious eight, I managed to provide a sufficient number of sets to plant the row. These were carefully put in, and as carefully covered with the hoe, in order that they might have a fair chance. My plants came up very irregularly as to time, but in the end there was a fair stand, and the tops grew off so promisingly, that every thing augered favorably for the success of my experiment. My land was a black sandy loam—some of the best on my farm. It had been thoroughly and deeply pulverized; was already rich; for as it occupied the border of a ditch, the scrapings from which had been repeatedly

thrown upon it, it contained an abundant supply of decomposed vegetable matter, besides the supply of manure which was added to the furrow;—and it was most thoroughly drained, inasmuch as from its situation, no water could accumulate upon it.

Now see the result. The crop was well worked;—indeed it was watched and nurtured with all the attention that a fond parent could extend to a favorite child. By the end of June, having passed through all the usual stages of developement and growth, the vines were prostrate and dead, and as nothing more could be gained by delay, early in July, I proceeded, with anxious anticipations, to gather the crop, injoining upon my most trusty man, not to suffer one of the precious offspring of my cherished Rohans, to remain secreted in their mother earth. The product of the one hundred feet row was a scanty bushel of miserable tubers, not much larger than my whites and pink-eyes, which grew beside them, without having received more than one tenth part of the labor and attention. The largest, instead of weighing three pounds, would not weigh eight ounces, and at the risk of incurring the maledictions of all the Rohanites, and being laughed at by you, gentle reader, to boot, I must say, that altogether there was probably never a more wretched return for kindness bestowed, or a more overwhelming disappointment of hopes fondly cherished. Nor did my vexations end here. My wife, good soul, whether from that innate curiosity, for which the sex is so famed, or from a desire to give me "a treat," I will not take upon me to decide, without my knowledge, had some of my Rohans served for the table. Now I am fond of a good mealy potatoe, and flatter myself, that my gustatory organs possess sufficient discrimination to distinguish a good from a bad one. But, ye shades of Raleigh defend me! of all the roots called tubers, that assume the shape of an Irish potatoe, a Rohan is to the taste the most insipid and worthless—Caleb Bement's gusto to the contrary notwithstanding. This surely must have been the breed first introduced by Sir Walter Raleigh into Europe. If so, I can well conceive that a nation who had been so long accustomed to better things, would be reluctant to adopt such an insipid, unpalatable root, as an article of diet. If my hypothesis be true, the present improved varieties of Irish potatoe have been formed out of the worthless Rohan, by progressive improvement; precisely as the beautiful and stately Durham, has been formed from the common cow, and Mr. Lossing's Berkshires, with black and white spots, and exactly three white hairs on the end of the tail, from a cross between the ugly, squatty, Chinese, and some English—perhaps Saxon—breed of hogs.

Having now opened to you freely, my joys and my sorrows, and spread before you some of the arts and mysteries of book-farming, I feel too much overpowered by grief and disappointment by the issue of my Rohan experiment, to proceed further with my reflec-

tions. While, therefore, I cordially wish you more happiness, I must fly to my good *mershiem* for consolation, and if I should ever be so fortunate as to recover from my present depression, I may obtrude upon you some more of my *random reflections.*

DEIDRICH BUCKTHORN OF BUCKTHORN HALL.

For the Southean Agriculturist.

OBSERVATIONS ON CATTLE, ROOTS, SILK-WORMS, &c.

PALMETTO HALL, DEC. 19TH, 1840.

Mr. Editor:—I am sorry to see that the desire to cultivate root crops and the grasses, is not keeping pace with the mania for improved breeds of cattle, hogs, &c., for the fact is, that the breed of animals decidedly the best adapted to our present cruel course of treatment is our present, as the valuable property of being able to endure rain, cold, and hunger, has been carefully cultivated and kept in practice for many generations past, and the experience with one half-Durham heifer, one three-quarter Durham bull and one Devon cow, fully satisfies me that the *part* Durhams, and I think the whole Durhams too, will not grow as large nor keep as fat as our native cattle, if they can ever be called fat, and the Devon will grow no larger, and even with much better fare, will not more than equal the natives, which you see is in strong contrast with Mr. Carrol's experience; and as regards breeding, his principles are certainly a smashing innovation upon the hitherto received theories and practices on the subject. All this is merely an introduction to my experience and theory of the cultivation of roots.

Among the beets I give the decided preference to the mangle wertzel over the sugar beet, because it suits our shallow soils better, as it grows more above than below ground, and consequently is more easily cultivated, and contends better with grass and weeds, stands our climate and insects, and the predatory habits of our negroes better, and is longer fit for use, and, I believe, more productive. I planted flush in one of the poorest beds in my garden, which is a salt homock, in February, 1838, one ounce of mangel wurtzle, they bore seed the summer of 1839, and in July of 1840 I pulled three roots that were about two and a half feet long, and five or six inches through in the largest diameter, and I believe that cattle would then have eaten them. I cannot say what proportion withstood the first summer as I made no observation on the subject, being ignorant of the general belief, that they could not endure the summer's sun. In February, 1840, I planted one pound of the sugar beet seed in the same garden, and similar (but not the same,) soil, and I have now about one third remaining, and they are so hard that cattle refuse to eat them. Both parcels were neglected during the summer, and therefore did not serve to form any fair idea of what they

might do under proper management. I have sown some of the Altingham carrot, and the mangel wurtzle in exactly the same spot, in order to give them a fair and comparative trial, and I will try to let you know the result in due time. I have adopted the following system of cultivation as the only one suitable to our circumstances. The land being level, (if it is not it must be made so,) I track it every three feet with the bull tongue plough, and if the soil requires manure, which almost all our lands do, I run the barshare or shovel plough in the track as deep as possible, and scatter the manure at the bottom of this trench. I then turn back and bed up as well as I can with the plough, and finish off with the hoe, or bed entirely with the hoe if more convenient. With a small and very simple dibble, I dibble holes for the seeds at every six inches, and put only two or three seeds in each hole, and cover it with the hand or heel, so as to press the earth close to the seed. When the plants acquire a sufficient size, I thin the beets to one plant in every other hole, the intervening ones being sufficiently large to feed the cows or pigs, but the carrots I leave one plant in each hole, as they require less room. As we do not require these roots until sweet potatoes are done, I think that the best time to sow them would be in the fall, say about one month later than the ruta baga, as they would then be fit to feed upon by April, if not earlier, which is the time we stand most in need of food for our cattle, for after June, or even May, we have grass enough in our corn fields.

Now that the Multicaulis mania is cured, a person may prefer another variety to the Multicaulis, without being suspected of any sinister designs, and further experience leads me to give the *Morus Morettiana* the preference, as uniting all the merrits of the former, with that of the leaves not drying up so soon. Last March I raised worms enough to make a flour barrel full of cocoons, and the worms were fed upon wet leaves whenever it rained, which it did frequently, and the leaves were generally gathered early in the morning, while wet with dew, for the day's consumption, and I could not perceive any bad effect from it, nor were there more deaths than might very naturally have been attributed to other and sufficient causes.

Do you want a neat prescription for mange in dogs, (and why not in hogs too?) I have tried it in two severe cases with entire success. *Lotion for the Mange:*—R. white Hallebore root bruised, two ounces, boil in three pints of water down to two pints, then strain it and add while hot, Sal Ammoniac two drachms, Corrosive Sublimate one drachm, Cape Aloes half ounce,—wash the dog in soap and water, and when dry wet him well with this; he may roll or rub but he cannot get it off.—(Taken from *Clater's "Farrier."*)

For the Southern Agriculturist.

ON THE GEORGIA FEVER AMONG HORSES.

JANUARY 19TH, 1841.

Mr. Editor:—There is now prevailing in the lower part of our State, and perhaps elsewhere, a disease known as the Georgia Fever, which attacks horses, and has proved fatal to a large number of them. I am not aware of its having ever been here before the last season, when a number of horses in the livery stables in Charleston were attacked, and a large portion of those so attacked died, as I have been informed. It was found to be highly contageous. With the summer, I believe it ceased, at least I heard nothing of it. But it again made its appearance this winter, in the city, and in the livery stables. Some of my friends who unfortunately carried their horses there, got them infected, and have lost severe. The disease has spread into the country, producing much uneasiness, and loss, in the services of the animals, and in many cases the loss of the animals themselves. My object in addressing this note to you is to request information as to the origin, nature, and cure of the disease. Will either you or some of your correspondents furnish the information requested above.

[Yours, truly,] G. A.

Remarks of the Editor.—We can furnish our correspondent with but little information on the subject, but hope that some of our readers will do so. The name of the Georgia fever we understand, was given to this disease *here*, because it was first observed among some horses brought from that State. The disease appears to be highly inflammatory. The first symptoms are a drooping of the head, a loss of appetite, and of course of spirit, a running of the eyes and nose. As the disease progresses the feet and limbs become swolen. The remedy, which as we have been informed, has been found most efficacious, has been to bleed copiously as soon as the symptoms are noticed. This is said to be almost a certain cure. We have had two horses laboring under this disease, both were bled copiously, (from 4 to 6 quarts,) and fed lightly on bran and oats. They are now both well, and were sick very little more than a week. No medicine was given. In fact, we are informed by one, who has had considerable experience, that all medicine proves decidedly injurious, and that he had not seen a single instance in which it was administered, that the horse did not die. If the first bleeding should not prove sufficient, a second is resorted to, but this is rarely necessary. When the legs begin to swell, the disease is said to be on the decline. We have given these imperfect answers to the queries of our correspondent, with the hope that the remedy which has been so efficacious in our hands, may be found equally so in that of our friend's, should they be so unfortunate as to have occasion for it. We request however that some of our readers will reply to them more fully than we have been able to do. [ED. SO. AGR.

THE TREATMENT OF SICK ANIMALS.

THERE are so many erroneous notions prevalent in the community respecting injured or diseased domestic animals, and such unnatural and injurious practices as a consequence of these incorrect views, that no apology is necessary for an attempt to subserve the cause and interests of these useful creatures, who, if they had tongues to speak, would tell sad tales of the wrongs to which they have been, and still are, too often subjected.

We do not propose to give an essay on the particular cases that require attention—our object is rather very briefly to ask the owners of domestic animals to be guided by a few correct principles, which are applicable to nearly all cases, and which will at least prevent our doing harm where we are not able to effect much good.

In the first place, then, we would insist, that when an animal is well he never requires any medicine—and when he is sick, we would protest against his being dosed with articles that are said to be good for a particular disease, without any reference to its violence, or the symptoms, as common sense would dictate; that remedies the most opposite in their character and effects may be equally advantageous in different periods of a case.

Always distrust the man and the remedy, when your friend declares that an article is always '*good*,' or a '*certain cure*' for a disease, without reference to its symptoms—prescribing for the name of the disease, rather than the disease itself: this is the very essence of quackery, in man or beast.

A large proportion of the diseases of animals closely resemble those of the human family, require a treatment conducted upon the same general principles—with some variations and some peculiarities, it is true, but none of those outrageous departures from common sense which are too frequently witnessed.

A horse with pleurisy, or inflammation of the lungs, or apoplexy, requires a widely different treatment from one with colic or with worms. There is no more mystery about the diseases of a horse or an ox than about those of a man, and a violation of natural laws is as productive of pain and injury in one as the other.

There is too a great propensity every where to resort to active treatment in all cases—a feeling that is encouraged by the ignorant or designing for selfish purposes. An adviser in sickness is often most useful, and shows most skill where he only tells what is to be avoided, and waits for indications for more active measures—doing little more than preventing ignorant but well-meaning persons from interfering with salutary changes that may be going on.

Remember that there is a restorative power in nature, to which it is always better to trust than to direct remedies without knowing for what particular purpose they are given.

There is never occasion for the administration of the disgusting combinations which the poor animal is made to swallow, from the whim of an ignorant horse or cow-doctor. Many a fine beast has been lost by his owner trusting to such prescriptions.

When your animal has fever, nature would dictate that all stimulating articles of diet or medicine should be avoided. Bleeding may be necessary to reduce the force of the circulation—purging to remove irritating substances from the bowels—moist, light and easily digested food, that his weakened digestion may not be oppressed—cool drinks to allay thirst, and to some extent, compensate for diminished secretions—rest and quiet, to prevent undue excitement in his system, and so on through the whole catalogue of diseases—but nothing to be done without reason. Carry out this principle and you will probably do much good—hardly great harm;—go on any other, and your measures are more likely to be productive of injury than benefit. But as we have before said, our object now is not to speak of diseases in detail—it is rather to encourage our agricultural friends to *think* before they *act*—to have a reason that will bear examination for every step in the management of a sick or injured animal—to remember they have a powerful assistant in *nature*, if she is fairly used—and that specifics, as they are called, are much fewer and less to be trusted than their proprietors would have us believe. We might, indeed, almost sum up what we would desire in one general direction of five words—TREAT YOUR BRUTES LIKE MEN.—*Farmer's Cabinet.*

DISADVANTAGES OF FEEDING ENTIRELY ON DRY FOOD.

HORSES and cattle fed on chopped oats or rye straw in its dry state, will obstinately refuse to take up all that is put in the troughs, and what they consume will be less nutritious than when slightly fermented. The process is the following, to feed on a cheap plan and keep stock in better health and general condition, than with any other system: Have a box of sufficient size to contain all the food for your animals for one time feeding, cut oats, rye, or even wheat straw and mix with it one half gallon of Indian or rye meal for each beast, sprinkle in a little salt with water enough to moisten the whole mass, let it stand before feeding at least twelve hours, or till it acquires a slight acid taste; then give it to the stock in the proportions you measured in, and your horses and cattle will be so fond of it, that they will lick up every straw, keep fat and do well. By this mode I have found, from three years experience, that horses and cows will do better than upon all the corn and dry fodder you can give them.—*Agriculturist.* T. F. CON.

HORTICULTURE.

It is our intention in this department of our Journal, to give an account of the several species and varieties of vegetables, with the best modes of culture at present, adopted by gardeners. Our time and other occupations will not permit us to write out seperate articles on each. We have therefore determined, to select these from the more recent publications, and to append to them notes, pointing out the differences in time, or mode of culture necessary to be observed to ensure success with us. In this way, we think, we can do perhaps more acceptable service, than by writing original articles ourselves, as we shall endeavor to correct every error either of season or culture, which may mislead the novice in these matters. We shall select for our text book "Vegetables—Cultivation and Cookery, by Wm. Rogers," a recent English publication, which as a whole, appears to be best adapted to the purpose we wish it for. We shall not however confine ourselves to it, but shall also extract from the various Horticultural Journals of the day, which we have made arrangements for receiving regularly. These we shall compare with Squibb, and the experience of our own gardeners. On some vegetables, such as cucumbers, melons, egg-plants, tomatoes, &c., we shall furnish original articles, as the culture of these in the South differ not only as to time, but as to management. We shall follow the alphabetical order, as laid down in Rogers, and when we meet with a good article on any of the vegetables we have already passed, we will insert it after the regular quantum of selections has been made, forming as it were, a kind of appendix.

All of our remarks and alterations will be in italics, and enclosed in brackets. The dates or times for performing the various operations as given by us, are intended for the latitude of Charleston, and our readers must make the necessary allowances for their different localities, recollecting that in receding from the sea-board, or in ascending hilly or mountainous countries, some allowance has to be made, although the latitude be the same. It will not be amiss to premise, that the beginning of March is the usual time for commencing our general garden operations. In the city, the sowing some few vegetables is ventured earlier, but they require protection, as we do no consider ourselves safe from frosts until April. A good general rule would be, to plant a few of those wanted for a first or early crop about the time the peach or plum trees blossom, and the general crop when the pine tree is in bloom. By observing these simple directions, the young gardener will be at no loss as to the proper time for commencing his operations.

In autumn, our cool weather commences in October, towards the last of which we are visited with slight frosts, but seldom have a black or killing frost before the middle of November.

With these few preliminary remarks, we commence our selections by some excellent general remarks on gardening, from Bridgman's Young Gardener's Assistant, (followed by extracts from Rogers,) which we are sorry to divide, but find it too long for one number, as we wish to give variety.

With respect to the flower garden, the green house, hot house, and orchard, we shall not be able to follow any certain plan; we will give the best directions we can find in each department, and the reader must refer to the index for ascertaining where he may find any particular article he may wish. J. D. L.

GENERAL REMARKS ON THE MANAGEMENT OF A KITCHEN GARDEN.

BEFORE I commence the catalogue, it may be necessary for me to direct the reader's attention to some important matters, essential to the good management of a kitchen garden.

The mode of laying out the ground is a matter of taste, and may be left to the gardener himself; the form being a thing of trifling importance in the production of useful vegetables, or whether the ground be laid out in beds of four or ten feet wide, provided it be well worked, and the garden kept neat and free from weeds.

Those who have not a garden already formed, should, however, fix on a level spot where the soil is deep; but as we have not always a choice, I would recommend the reader to that which is within the reach, and ought to be the object of every man, namely, to make the most of what he has.

To this end, he may form a border round the whole garden, from five to ten feet wide, according to the size of the piece of land; next to the border a walk may be made from three to six feet wide; the centre part of the garden may be divided into squares, on the sides of which a border may be laid out three or four feet wide, in which the various kinds of herbs may be raised, and also gooseberries, currants, raspberries, strawberries, &c. The centre beds may be planted with all the various kinds of vegetables. The outside borders facing the east, south and west, will be useful for raising the earliest fruits and vegetables; and the north border, being shady and cool, will serve for raising and pricking out such young plants, herbs and cuttings, as require to be screened from the intense heat of the sun.

It may be necessary to state further, that though shady situations are useful for the purpose of raising celery, cabage and other small plants, slips, &c. in the summer season, that all standard trees should be excluded from a kitchen garden, for the following reasons:—First, their roots spread so widely, and imbibe so much moisture from the ground, that little is left to the nourishment of

any plant within the range of their influence;—Secondly, when in full leaf, they shade a large space, and obstruct the free circulation of the air, so essential to the well-being of all plants;—Thirdly, the droppings from trees are particularly injurious to whatever vegetation they fall upon.

Previous to entering on the work of a garden, the gardener should lad down rules for his future government. In order to this, he should provide himself with a blank book. In this he should first lay out a plan of his garden, allotting a place for all the different kinds of vegetables he intends to cultivate. As he proceeds in the business of planting his grounds, if he were to keep an account of every thing he does relative to his garden, he would soon obtain some knowledge of the art. This the writer has done for the last twenty years, and he flatters himself that a publication of the results of his practice will be interesting and useful to his readers.

If gardeners were to make it a rule to record the dates and particulars of their transactions relative to tillage, planting, &c., they would always know when to expect their seeds to come up, and how to regulate their crops for succession; and, when it is considered that plants of the *Brassica*, or cabbage tribe, are apt to get infected at the roots, if too frequently planted in the same ground, and that a rotation of crops in general is beneficial, it will appear evident that a complete register of every thing relative to culture is essential to the well-being of a garden.

One important point to be attended to, is to have a good supply of good old manure, and other composts, ready to incorporate with the earth; also a portion of ashes, soot, tobacco dust, and lime, for the purpose of sowing over seed beds in dry weather; this will tend in a great measure to destroy insects, which sometimes cut off the young plants as fast as they come up.

If the ground cannot be all manured every year as it should be, it is of primary importance that those vegetables be provided for which most need manure. A perusal of the catalogue will enable the young gardener to judge of the kinds of garden products which require most. Lest I should not have been explicite enough in this particular, I would inform him that good rich manure is indispensably necessary for the production of broccoli, cauliflower, cabbage, lettuce, spinage, onions, radishes, and salads in general.

In the event of a scanty supply of manure, those kinds of vegetables which are raised in hills or drills, may be provided for by disposing of the manure immediately under the seeds or plants.

The next important matter is to have the ground in suitable condition to receive the seed; I wish it to be understood that I am an advocate for early sowing and planting, even at the risk of losing a little seed, provided the ground be fit to receive it. A light sandy soil will be benefitted if worked when moist, as such treatment will have a tendency to make it more compact; on the contrary, if a

clay soil be worked when too wet, it kneads little dough, and never fails to bind when drought follows; and this not only prevents the seed from rising but injures the plants materially in their subsequent growth, by its becoming impervious to the moderate rains, dews, air, and influence of the sun, all of which are necessary to the promotion of vegetation.

Some gardeners, as well as some writers, recommend some certain fixed days for sowing and planting particular kinds of seed; I think it necessary to guard my readers from being misled. The failure of crops may be often attributed to the observance of certain days for sowing. If some kinds of seed be sown when the ground is wet and cold, they will become chilled in the ground and seldom vegetate. If they be sown in very dry weather, the germinative parts of the seed may become injured by the burning rays of the sun, or the young plants may get devoured by insects as fast as they come up. To obviate these difficulties, I have generally allowed a week or ten days for the sowing of seed, intending the medium as the proper time for the vicinity of [*Charleston.*] With this clearly borne in mind, the reader who observes the difference in the degrees of heat and cold in the different parts of the country, will know how to apply these instructions accordingly.

Much depends on the manures used on particular kinds of soils. The great art of improving sandy and clayey soils, is to give the former such dressings of clay, cow dung, and other kinds of manure, as will have a tendency to bind and make them more compact, and consequently more retentive of moisture; and to the latter coats of horse dung, ashes, sand, and such other composts as may tend to separate the particles and open the pores of the clay, so as to cause it to approach as nearly as possible to a loam.

The nearer the ground approaches to a sandy soil, the less retentive will it be of moisture; the more to clayey, the longer will it retain it; and the finer the particles of which the clay is composed, the more tenacious will it be of water, and consequently be longer in drying, and the harder when dry; but earth of a consistence that will hold water the longest, *without becoming hard when dry*, is of all others, the best adapted for raising the generality of plants, in the greatest perfection. This last described soil is called loam, and is a medium earth between the extremes of clay and sand.

I have, in most cases, recommended drills to be made at certain depths for the different kinds of seed; and when I have stated that the drills should be two inches deep, it is intended that the seed should be covered only one inch, which it will be when planted in these drills, and covered, and so in proportion for any other depth required. This may serve as a guide to the young gardener, but circumstances alter cases; if, for instance, some particular crops should fail, this would render it necessary, if the season be far advanced, to risk a further planting of seed, even if the weather be

hot and the ground dry; if this be planted a little deeper, it may escape the violent heat of the sun, and in the event of a shower, the ground would become sufficiently moist to bring it up; whereas, it sometimes happens that seed sown after a shower does not vegetate until after the season is too far advanced to bring the crop to perfection.

The work of drilling by those who have no machine, may be performed in various ways; in some cases a plough is used, in others a small hoe, or a dibble drawn along the edge of a board or line; it is of little consequence which way the work is done, if it be well done. While I leave the gardener to make his own choice of tools, I would suggest that he be provided with two or three drilling machines; these, every handy man may make for himself; they should be in the form of a garden rake, with a stout heavy back, and five teeth, two inches broad, and tapered so as to enter the ground, and leave drills two inches deep. If one be made with the teeth eight inches apart, another twelve, and another fourteen, they will be useful in making drills for various seeds; and drills thus made serve instead of straining a line when transplanting Cabbage, Lettuce, Leek plants, &c. the line being stretched at one edge of the bed, and the drilling machine drawn straight by the line, makes five drills at once. If they are straight they may be kept so, by keeping one drill open for the outside tooth to work in, until the ground be all drilled.

Gardeners practice different methods of covering up seed, some do it with a hoe, others with a rake or harrow; some draw a portion of the earth to the side of the bed; and after sowing the seed, return it regularly over the bed; in some particular cases a sieve is used, in others a roller. Rolling or treading in seed, is necessary in dry seasons, but it should never be done when the ground is wet.

[To be Continued.]

VEGETABLE GARDEN.

ARTICHOKE.—Cynara.

The generic term cynara is supposed to have been so called by the ancients, on account of its ash-coloured leaves; and the word choke is no doubt taken from that part of the head which is left after the bottom part of the scales is eaten, and which, if accidentally swallowed, produces a sensation similar to choking.

This vegetable, which affords a pleasant and nourishing diet, is a native of Africa, and also of some of the warmest parts of Italy, whence it was first brought to this country [*England*,] in the reign of Henry the Eighth, in the year 1548; and, from the moisture of our climate, and the attention bestowed upon its cultivation, the size and flavour were so much improved, that the Italians sent for plants from

England, supposing them to be of another variety. They were, however, mistaken, for the plants soon returned to their original size and quality, upon being restored to their native climate.

The artichoke is principally cultivated in the gardens of the higher classes, by whom it is much esteemed; and it is considered more as a luxury than a profitable esculent.

The heads, in their immature state, and before the flowers are open, are boiled in salted water, till all such parts of them become soft as are capable of being so. The scales are then plucked off one by one; the lower part, or bottoms, as they are called, are dipped in a mixture of melted butter, well seasoned, and the fleshy substance sucked from the rest. But there is generally so little to be obtained as almost to justify the observation of a raw country servant, who, having waited at supper, when artichokes made one of the dishes, was eager, on his return into the kitchen, to taste a kind of food which he had never seen before; but to his great disappointment, finding little more than a kind of horny substance, which equally defied his tongue and his teeth, declared, with great naïveté, that gentle folks seemed to him to have strange fancies, for as far as he could discover, one leaf would do as well to lick up the butter as a thousand.

On the Continent, artichokes are more generally used than in England; they are eaten by the French and Italians in a raw state, as a salad, but are preferred after having been boiled, and they form a standing dish at a French breakfast.

Artichoke bottoms are also dried in the sun for winter use, forming an agreeable side dish throughout that season.

There are three varieties of the artichoke, but two only are cultivated, the third being very small and indifferent.

1. The globe, so called from its globular head, of a dusky purplish tint; the scales are turned in at the top more than in any other variety: it is generally preferred for the main crop, as the scales or edible parts are thicker, and possesses the most flavour. It is, however, a much more tender sort; and, in the severe winter of 1739—40, was nearly lost to the country. Previously to that time, it was the only kind in cultivation; and, on account of its superiority on that occasion, our gardeners were supplied from Guernsy with the French kind, until the globe variety could again be propagated.

2. The French is known by its greenish head, which is oval; the scales are more open, and not turned in on the top so much as in the globe; though it has not the same thickness of flesh, it is much hardier, and very prolific, and deserves cultivation in every garden: both sorts continue producing the heads from [*May to August,*]

3. This variety I call the Italian, which I should not have noticed had I not seen it creep into many gardens, producing small conical heads, and very thin pointed leaves or scales. It is of no use for

the table, and should be entirely excluded. [*The French have several other varieties, but as the preceding are the most generally cultivated, it is needless for us to describe them at present.*]

Culture.—The artichoke is propagated by rooted suckers or young shoots, rising in the spring, from the roots of the old plants. These are fit to slip off for planting at the end of March or beginning of April, [*February or March,*] when from eight to ten inches high. [*They are also propagated by seed, which may be sown on a well manured seed bed in drills eighteen inches apart, and covered a half inch deep. The plants should be thinned out to six inchos, and will be fit to set out in September or February.*]

For a new plantation, select an open compartment, with a light, rich, and rather moist soil, of good depth: let it be well dug and manured; then plant the sets with a dibble, four feet between the rows, aud two feet apart in the cow; give some water to each plant, and occasionally, if the weather continues very dry, till they have taken root.

This method of planting in single rows will be found superior to the triangle system, which forms too great a mass, and causes the plants to become weakly, besides occasioning more labour to the gardener. They must constantly be kept free from weeds by means of the hoe, which likewise prevents the surface from getting hard; and I have fully proved, from observation for a number of years, that the more frequently the ground is disturbed with the hoe in dry seasons, the more moisture it retains.

In the autumn remove all the large decayed leaves; then dig and well manure the ground between and along each row. In severe weather, artichokes require more or less protection, and may be covered with the earth taken from between the rows; but if the severity increases, the globe kind, especially, must have an additional covering, with plenty of dry litter from the stable.

In the spring, the litter and earth must be removed. In March [*February,*] according to the weather, the stocks are examined, and about three of the strongest left to grow and produce heads; the rest are removed by pressure with the thumb, or by a knife. These shoots or suckers are used for the new plantations. Dig the whole ground level, and close up to the crown of the root of each plant, using at the same time plenty of good rotten dung, or sea-weed, if it can be procured. The latter is one of the best manures for artichokes. Nothing more requires to be done, during the summer, than to keep the ground free from weeds. [*New plantations should be made annually, as these produce their heads much later than the old; thus affording a successional crop for the table. The old plantations are usually fit to cut in May and June, the new in June and July.*]

Artichoke plants will continuue productive for many years, though after six or seven they begin to degenerate, the heads

becoming smaller and less succulent; it will then be necessary to renew the bed with young plants. It is a good plan, after the second year, to keep up a constant succession. The bed will then always contain strong, young, healthy plants in a bearing state.

If the heads are wanted fine and large, all the lateral ones growing on the same stalk, should be removed in their young state; and when the entire crop on a stem is taken, be careful to cut it off or bend it down close to the ground, in order to give the plant more strength for new shoots.

ASPARAGUS.—ASPARAGUS.

THE name of this plant is of Greek origin, signifying a young shoot before it unfolds its leaves. It is evidently a native of this country, being found wild in Essex and Lincolnshire. It is also found on the borders of the river Euphrates, in Asia, where it grows to a very large size.

Asparagus is said to promote appetite, but is not considered to afford much nourishment, and is comparatively a vegetable of luxury. It occupies a large proportion of a gentleman's garden, and is seldom seen in that of the cottager. The young shoots are boiled a few minutes, until they become soft; they are principally served to table on a toast with melted butter; seasoned, they also make an excellent soup.

This vegetable is cultivated very extensively for the London markets; and it must appear almost incredible to those who have not witnessed the loads of this article daily heaped on the green stalls of the metropolis for the space of three months, that forty acres are under asparagus in the neighborhood of London at one time. Wilmott, a great grower, at Deptford, has had eighty acres entirely under this crop.

Until towards the end of the seventeenth century, a large quantity of remarkably fine asparagus was exported from Holland, the deep, rich, moist soil of that country being genial to its growth.

Asparagus is propagated only by seed, which, as well as one and two or three-year old plants, may be purchased of the nurserymen or seedsmen; when a new plantation is formed, the latter practice is generally adopted in order to save time.

There are three varieties of the asparagus named in the seedsmen's catalogue, but there is a great similarity between them, and I doubt if these supposed varieties were cultivated in the same soil and atmosphere, whether there would be found any difference between them, except, perhaps, in the colour. The following is a description of them:—

1. Battersea is famed for producing fine asparagus, the heads being large, full, and close, and the tops tinted with a reddish green colour; this is the sort generally cultivated by market gardeners.

2. The Gravesend asparagus is more green topped, and not generally so plump and close, but is reckoned better flavoured.—Both varieties are held in great estimation.

3. The Giant asparagus is greatly extolled by the London seedsmen, on account of its size; but the author considers the secret to lie in the quality of the soil, for occasionally buds of immense thickness are produced in common beds; and in the Gardener's Magazine there is an account of sixty buds having been cut near Leeds, in Yorkshire, which weighed nearly seven pounds.

Culture.—The middle of March, [*February,*] or thereabouts, if the weather is suitable, will be found a good time to sow the seed in quantity, according to the number of plants required for a small garden. A pound of seed will produce a requisite number of plants.

The seeds are generally sown broadcast on a four foot bed, but by far the better way is to sow it thinly in drills about two inches deep and fifteen inches from row to row. It should be slightly trodden in, and the bed made smooth with the rake; the ground must be kept as free of weeds as possible, and stirred with the hoe two or three times during the summer. If the soil is not very rich, some good rotten dung must be dug in before sowing the seed, as strong one-year's plants are the best for transplanting. About the end of the following October some stable litter should be spread over the ground to protect the young roots from the frost.

The best ground for asparagus is a light, rich, sandy loam. The soil should not be less than two and a half feet deep. Before planting, it should always be trenched to the depth of two feet, and plenty of dung buried at the bottom, as no more can be applied there after the beds are planted. The ground can scarcely be too well manured: for, although the plants naturally grow in a poor, sandy soil, it is found that the sweetness and tenderness of the shoots depend very much on the rapidity of the growth, which can only be promoted by the richness of the soil.

The ground being well trenched, manured, and levelled, the quarter must now be divided into beds four feet wide, with two feet alleys, as being the most convenient for cutting the shoots and weeding, &c. The work should all be done in fine weather, as the ground can be more easily worked, and the planting better performed, than if the ground is wet and cloggy. It is also a good plan to prepare and trench the ground a month or six weeks before hand. After the beds are marked out, and before the planting commences, a layer of rotten dung should be spread over the beds, and regularly dug in with the spade, taking care to reject all the stones which appear, as they are hurtful to the plants, and occasion inconvenience in cutting the buds.

The beds being prepared, and a strong stake driven in to the depth of two or three feet at each corner; about the middle of

March, [*any time during winter, but if possible it should not be delayed later than February, though they will succeed even as late as March,*] if the weather is dry commence the planting. Take up the plants carefully with a fork from the seed-bed, and expose them to the air as short a time as possible; and, at the time of planting, place them in a covered basket, with a little sifted earth mixed with them.

The distance at which they are commonly planted is nine inches in the row, and one foot between the rows; so that, if the piece of ground to be planted is perfectly level, and the rows quite straight, every fourth row can be left to form the alley. The crowns of the plants are generally covered two inches with mould.

The method of planting is as follows:—Stretch a line lengthwise along the bed, nine inches from the edge, and with a spade cut out a small trench, about six inches deep, turning the displaced earth to the other side of the trench, on the bed; and, having the plants ready, set a row along the trench, nine inches apart, with the crown of the roots two inches below the surface, drawing a little earth upon them, just to fix them as placed. Having finished planting the row, cover them directly with the earth taken from the trench, raking it back regularly an equal depth over the crown of the plants. Proceed then to open another trench, a foot, from the first; plant it as above; and in the same manner plant three or four rows to each bed. Then lightly raking the beds lengthwise, draw off any stones or hard clods, and dress the surface neatly and evenly. Let the edges be lined out in exact order, allowing two feet to each alley. If the weather at the time of planting is very dry, water them occasionally, till the plants are established.

An asparagus quarter should not contain less than a rod of ground, as it often requires that quantity to furnish a single good dish. For a large fumily, about twelve or sixteen rods are generally kept in a productive state.

Nothing further will be required during the summer, than to keep the beds perfectly clear from the weeds; and the following winter to cover them with some rotten manure, to preserve the crowns from the frost; if, in the spring, the earth is found to have settled in any part, which in new-made beds is often the case, the deficiency must be made up with more mould.

The crop is permitted the two first years, and a great portion of the third, to run up to stalks, the beds being kept free from weeds, and the surface stirred. It is a common practice to sow onions, lettuces, or radishes upon the beds; but the author considers this practice injurious to the asparagus, especially after the first three years, as it must necessarily rob the ground of a large portion of its nourishment.

If very large heads of asparagus are required, they may be produced by planting them twelve or fourteen inches apart in the rows, and fifteen or eighteen inches between the rows. The ground

must also be very rich and highly manured. The author considers this to be the method by which the giant asparagus is produced, as in the course of his practice, by pursuing the same plan, he has met with the same results.

After the beds are arrived at maturity, which is generally the third year after they are planted, they will require the following systematic mode of treatment:—

From about the middle of October to the latter end of November, is the time to give the asparagus beds their winter dressing. This consists in cutting down the decayed stalks of the plants, close to, or within an inch of the ground, and clearing the beds from weeds drawing them off at the same time with a rake into the alleys to be buried, and spreading some of the earth upon the beds, which is called *landing up*. Then proceed to line out the alleys, the stakes that are placed at the corners of the beds forming a guide: the alleys must be dug one spade deep, and a good portion of earth spread over each bed, two or three inches thick, and then nicely levelled with the rake. It may be supposed by some, that in annual landing up the beds, they may in several years be considerably raised; but by the spring forking and raking, together with the repeated hoeings and clearing off weeds in the summer, and at the time of preparing for landing up in the autumn, a considerable portion of the earth is annually drawn off again into the alleys.

About the end of March, [*January*,] or towards the middle of April, [*February*,] before the buds begin to advance below, proceed to loosen the surface of the beds; introducing the fork slanting two or three inches under the surface, turn up the top earth near the crown of the roots, with care not to wound them. Then rake the surface of the beds level, and draw off the rough earth and hard clods into the alleys; also trim the edges of the beds, and surface of the alleys regularly and even. Loosening the bed in this manner enables the shoots to rise in free growth, admits the air, rains, and sunshine, into the ground, and encourages the roots to produce buds of a handsome, full size.

In general, transplanted asparagus comes up but slender the first year; it is larger the second; and the third year a few shoots may be fit for gathering; and the fourth, the crop will be in good perfection.

The best method of cutting them is to scrape away a little of the earth from each shoots; then with a sharp-pointed knife, made on purpose, with a narrow blade, six inches long, and finely sawed at the edge, cut off the shoot slantingly, about three inches below the surface, taking care not to wound the younger buds; advancing below in different stages of growth. Asparagus is in the best condition for cutting when it projects three or four inches above the ground, and while the top bud remains close and plump.

The cutting season usually commences towards the latter end of April, [*March,*] and should never be continued beyond midsummer.

Asparagus beds, with good culture, will continue to afford plentiful crops for twelve or fourteen years, after which the stools usually decline in fertility, and the shoots in quality; but the author has known instances of beds producing large and fine aspagus for a much longer period.

I have frequently observed in many gardens the depth of the alleys, which should always be kept filled up to within eight inches of the surface of the bed, as the roots of the plants extend as well as descend; if the alleys are left deep, by cutting down the sides of the beds and deep digging, the plants are materially injured.

The following hints may be useful to the young horticulturist.—A bed twenty yards long, with four rows of plants, at one foot apart each way, will take two hundred and forty plants, which at four years old will produce above one hundred shoots daily throughout the season; and the quantity will increase every year. The author has had more than fifty buds in the season, produced from one single root, the bed being in a high state of cultiuation, according to the method previously advised. From the above statement, a calculation may be made as to the quantity of land required to be planted to supply the wants of the family.

Where asparagus beds run east to west, or north to south, and the alleys are well filled up, they may be planted on the warm side, with a row of kidney beans of an early kind, which will not interfere with the cutting of the grass, and will produce sooner by a week or ten days than if sown in the open ground; or, occasionally where ground is scarce, a central row of early spring-sown cauliflowers may be planted, at thirty inches apart. The author has grown them remarkably fine, in such situations, without any detriment to the beds.

Asparagus beds should be enriched with an addition of good rotten dung, once every two or three years at farthest; the benefit of which will be evident in the quantity, as well as the size and quality of the produce. The dung for this purpose should be completely rotted, like that of old cucumber or melon beds. It should be applied after the stalks are cleared off, and spread two or three inches thick over the surface of each bed, and a double portion in the alleys; the beds being then slightly fork-digged, to bury it; after this dig the alleys in the usual way, and spread a portion of the earth evenly over the beds. In this way the enriching quality of the manure will be washed to the roots of the plants by the winter rains. [*A more recent mode of culture, is to plant the roots in single rows, on small ridges, four feet apart, and near the surface. The object being the "enriching of the surface soil, and encouragement of the surface-feeding roots, in opposition to the usual practice of deep trenching, and deep manuring." The plan is said to have answered admirably,*

but we doubt whether the ridge system will answer as well in our climate, as in Great Britain (where it has been introduced,) owing to the greater sultriness and heat of our summers. We, however, strongly recommend the surface culture. Let trenches be prepared from four to six feet apart, filled with manure, and the roots planted thereon, and covered three or four inches. The excellence of the shoot does not consist in its being blanched, but in having a rapid growth. Those who may wish to blanch them, may earth them up just before they shoot, or adopt the Austrian mode, and place over each a hollow tube twelve inches long. The large canes of our swamps would answer well for this purpose. The intervals between the rows can be cropped, the working of which will be an advantage to the asparagus. In the winter the manure can be applied over the plants, or what perhaps will be better, along the sides, and between the rows, which will also answer for the succeeding intermediate crop, for plants receive nourishment only from the spongioles, or extremities of their roots. Saline manures, such as sea-weeds, sedge, marsh, &c., are strongly recommended as manure, as well as pickles from meats, and even common salt. The produce from the surface system is said to be much greater, and finer than from the old mode. J. D. L.

THE FLOWER GARDEN.

For the Southern Agriculturist.

ON THE PLEASURES AND GRATIFICATIONS DERIVED FROM A FROWER GARDEN, WITH SOME REMARKS ON THEIR FORMATION, PLANTING, &c.

Mr. Editor:—Of all the pursuits in which mankind engage, none are more productive of true gratification than we find within the precincts of a flower garden. Here we find concentrated, the gay beauties of Flora's diversified kingdom; and what mind is there so destitute of taste but must derive from this source a degree of unmingled pleasure? What sweet solace to retire from the busy haunts of men and hold converse with the most lovely of nature's productions. Here the troubled mind will experience a soothing calmness while the invalid will derive health, strength and vigor from the balmy sweets of this delightful retreat. To the scientific inquirer, what a field for instruction. If the casual observer can derive unmixed pleasure from simply viewing the gaudy colours of this gay assemblage, what a rich treat it must afford to those who can with scientific accuracy arrange, classify, trace their affinities, properties, &c. The field is vast, and the pursuit equally interesting as instructive. Independent of the intellectual advantages derived from a flower garden, what pursuit or avocation can be followed by amateurs so conducive to health? What recreation so interesting as nurturing with tenderness and care the blushing

rose, the gay tulip, the odouriferous jesamine, or the lovely violet. There cannot be a more convincing proof of the solid pleasure derived from an acquaintance with the gems of the vegetable kingdom than the admitted fact, that it is one of those gratifications which increases with our years, for we almost invariably find the hoary head the most devoted enthusiast. Our acquaintance with the vegetable kingdom may commence in the flower garden, but the intimacy once formed we shall soon discover nature in a different view. Wherever we trace our steps we will find new beauties previously passed unnoticed because unknown, but now the mountain and the vale, the forest and the praire, will all furnish matter for our admiration and insensibly fill the mind with ideas sublime in their conception and salutary in their effect. This is the case in general, and how much more so in particular, in the Southern States where bounteous nature has so profusely displayed her beauties, varying from the magestic magnolia, to the unpretending, but lovely violet. So diversified and various are the vegetable productions of the South, that divest the most extensive of European gardens of American contributions, although they are enriched with treasures from every country, and every clime, they would exhibit a meagre picture to that they now display. In a country therefore, so highly decorated by the floral goddess, it is a natural inference to assume that the period is not far distant, when every establishment will have its flower garden—in fact the taste which now prevails for flowers among the ladies of the South, renders this next to a certainty. Under this impression, I would beg leave to advance a few brief hints, which may in some degree aid the uninstructed in gardening operations, as to the formation and planting of a flower garden. The first point which demands our consideration is the

Site.—The site for the flower garden will be regulated by existing circumstances. It may either be placed in the immediate vicinity of the house, or at some distance. This will in a great measure depend on the taste of the owner, as some prefer having the flower garden in a secluded situation, while others prefer having it placed in such a position that the whole may be viewed from the windows. When the pleasure grounds are on an extensive scale, I would recommend placing the flower garden at some distance, but when it constitutes the entire ornamental department, the nearer it is placed to the mansion, so much the better, as it will be the most agreeable scene on which the eye can rest.

Aspect.—A south, south east or east aspect, is decidedly the most eligible. A free exposure to the morning sun is very desirable. The early rays of the sun are so truly conducive to vegetation, that every observer, even the most superficial, must be aware of this important fact.

Soil.—The soil best adapted for the free growth of flowers is a friable sandy loam. A stiff tenacious clay is decidedly the worst, and when this cannot be avoided, the natural soil must be pulverised by adding sand, or what is much preferable, decayed vegetable mould, which in general may be obtained in abundance from the woods. There is something peculiarly congenial in decomposed vegetable matter for nourishing plants, that its effects are perfectly obvious to every cultivator—but, in its selection, preference should be given to that where the oak, hickory, &c. predominate—that from resinous trees should be avoided as far as possible.

Laying out the area.—This is the most important part of the whole concern, and requires a degree of taste and experience to do the subject justice. There are various methods adopted in laying out the area of a flower garden, some prefer irregular figures cut out on grass lawns, with gravel walks interspersed, others adopt regular beds with various walks dividing them, some endeavor to effect a combination of both. These are termed styles, and it is perfectly immaterial what style is adopted so that it be invariably adhered to, and never mixed with any other style. In arranging the beds there should exist a degree of connexion, so that when completed the garden will display a perfect unity in all its component parts, each bed should have its exact position, so that no single bed can be either detached, or altered from its place, without deranging the whole. The size of the beds may be regulated according to the extent of the garden, and the walks should be regulated by the same criterion, but in no case should the latter be less than three feet in width, or they will dwindle in appearance to mere foot paths; nor wider than six, unless they are very long, and in a straight line.

Planting the beds.—This is a point which requires a considerable knowledge of the habits of plants to display their beauties to the greatest advantage. There are two methods followed by gardeners, viz. planting a number of species on the same bed, contrasting their colors, and arranging them according to their respective heights, and the other method is by planting each species in large masses. The massed flower garden is of comparatively modern invention, and perfectly distinct from the mixed flower garden, as in the former only one species is allowed to grow in the same bed, while in the latter, there may be as many species as the bed will admit of. By following the massing system every bed is perfectly distinct, and it is the only true method by which real variety can be produced, as in the mixed system all variety is destroyed by the excess of variety—but to make this matter perfectly obvious, I will ask if there is not more real variety in passing from a grove of oaks to another of pines, than we would find from a number of species in a heterogenous mass with no marked line to denote a

regular distinction. In conclusion, I would recommend that in selecting flowers for ornamenting the garden, variety should not be so much our object, as a judicious selection of such species as are free flowerers, and continue to bloom for the longest period, it is by such only that a regular and continued glow of beauty will be kept up for the longest period, and consequently the greatest possible pleasure derived from the garden.

A PRACTICAL GARDENER.

Charleston, 4th Jan., 1841.

CULTURE OF ANNUALS.

THE most natural period of sowing annuals is in the latter end of autumn, when they, as well as most other plants, burst from their capsules, and distribute the seeds in various ways; therefore, those that are natives of this country, or similar climates, may in part be sown at that period, for forming an early bloom in the following summer, to be succeeded by the part reserved for spring sowing, which is the period most usually devoted to that purpose. From the end of February [*January*] to the beginning of May, [*April*] flower-seeds may be sown, whenever the weather is favorable, and the ground in a proper state for that purpose—reserving the more tender sorts till about the middle of April [*March.*]

The depth of soil used as covering for the seeds should, in all cases, be apportioned to their size—for instance, lupins, sweet peas, and similar large seeds, should be buried two or three inches under the surface; while Princes feather, mimulus, poppy, tobacco, &c., of which the seeds are very small, should not be covered by more than a small layer of earth. It should further be kept in view, that seeds generally, and in particular those of a small size, vegetate more freely in a light than in a heavy tenacious soil; therefore, in cases when the former does not naturally exist, cultivators will find their additional toil amply repaid by procuring and only using light soil for covering the flower-seeds.

The manner of sowing vary according to the taste of the operator: the practice formerly adopted, and still often followed by gardeners and others, is to form with the fingers, in the previously prepared ground, a circle from one-half to three feet in diameter, and of the proper depth, in which the seeds were deposited, and the earth again returned; the whole being generally finished by clapping the surface gently with the back of a spade, or pressing the earth lightly with the foot, to assist in keeping out the drought. Of course the same practice of forming the reservoir for the seeds may be adopted whether the figure is intended to be a circle, a square, or any other form.

Some fanciful growers from the letters of their name, outlines of animals, &c. in their flower-beds, generally choosing for such purpose plants that possess a dwaf or compact habit of growth.

The young annuals, as well as other plants, when coming above ground, are liable to be destroyed by slugs and various insects, as well as injured, particularly the less hardy sorts, by the night frosts; to prevent which, various methods are recommended and practised. In small gardens a very excellent plan is to sow the seeds in circles, not more than six inches in diameter, and inverting a flower-pot; when the young plants appear above ground, the flower-pot should be gently raised on one side by means of a small wedge or stone, which should always be removed in the evening—the operator taking care to lift it to see that no enemies are enclosed. The flower-pot answers the double purpose of protecting the young plants, and retaining the moisture about them until they acquire sufficient strength to resist all such injuries. Lime-water, applied at any time, proves destructive to slugs, but if sprinkled on the leaves during dry weather or hot sun, it will injure them; therefore, that expedient should only be resorted to in the evenings, or during damp weather, when they have left their retreats. A sprinkling of quick-lime in the same manner is productive of the same effects, but always produces a disagreeable and unsightly appearance.

Next to slugs, earwigs are usually the most pestiferous annoyance the flower-grower has to encounter; their ravages, however, are more confined to certain plants, and are experienced at a more advanced period of the season—generally when the plants are in flower, or nearly so. The best means of getting quit of them, is to lay a few short reeds, pieces of rolled paper, &c. about the plants, in which they will take shelter during the night, and from whence they may be blown or shaken into a vessel of water in the morning.

The wireworm is also very destructive to certain kinds of annuals, particularly French marigolds, stocks, china-asters, &c., and attacks them from the period of germination almost to the time of flowering. The hard skin by which this enemy is covered effectually protects it from injury by any application that will not prove injurious to the plant; therefore, the only means to entrap it is to supply it with more agreeable food, such as pieces of potato, carrots, &c. which may be sunk in the earth around it, near the plants, marking the place, so that it may be withdrawn and the worms picked out daily until extirpated. They are most prevalent in soils recently brought under cultivation, as old pastures, &c.; therefore, care should always be taken that they be not introduced among borrowed earth from such places.

The management of hardy annuals, after briarding, consists in thinning them out to proper distances, varying from two to six

inches, or more, according to the sizes and habits of the plant; removing any decayed leaves or weeds, and supporting the weaker sorts by carefully tying them to neat stakes; the more, however, that this can be dispensed with the better, for plants never look so well as when left to assume their natural habits.—*The Amateur Florist's Assistant.*

PROPAGATING GREEN-HOUSE PLANTS.

UNDER this head it will be readily understood that we include those of the conservatory also, as all plants destined for the latter are propagated along with, and indeed are cultivated with the former, until their size either renders them unfit for remaining longer amongst them, or when of a proper size and age to be planted out permanently in the latter.

To enter into the detail of propagating green-house plants individually, would far exceed the limits prescribed to us, and, indeed, justice could only be done to such a subject in a separate volume. The cultivator who intends to propagate upon an extensive scale, cannot do better than consult the Exotic Gardener, by Cushing; or the Botanical Cultivator of Mr Sweet, both excellent practical propagators and cultivators, and whose works on this subject are complete of their kind. The former is now becoming scarce, and would be a valuable work if revised up to the present time.

This is now a very favorable season for commencing the work of propagation, either as regards the mode of rearing from seeds, or propagating from cuttings, layers, or dividing the plant, and also for the more expeditious method of grafting, inarching, or budding.

For the propagation of plants, Mr. Sweet offers the following rational remarks: "A small house should be appropriated, a north-eastern aspect is preferable to any other, so as to have the morning sun, and none afterwards; they then want no artificial shading, for the less sun that cuttings have before they are rooted, and the more light, the better. A pit might be made in the house, and one part filled with fresh tan, another part filled with rotten tan, and the third with mould." It is evident that this intelligent cultivator is here alluding to nursery cultivation, to which he was attached at the period of his writing on this subject; but we would suggest to private cultivators the mode adopted by us at this very time in the gardens of H. R. H. Prince Leopold, of Saxe Coburgh, which is the application of one or more common garden frames, according to the extent of the intended increase. But to return to Mr. Sweet's directions: "In the fresh tan might be plunged, under hand-glasses or bell-glasses, any cuttings of plants requiring heat; in the rotten tan, under bell-glasses, any kinds not requiring heat; and in the mould, under hand-glasses, large cuttings of green-house plants, &c., which require no heat. Cuttings, particularly of woody

plants, root best in fine sand, and are safer to pot off after being rooted, as the sand shakes clean from their roots without injuring them. When planted in mould the roots are apt to break off in parting them; but some of the herbaceous or soft wooded kinds will not root well in sand, and must, therefore, be planted in mould. Cuttings must be put in when the wood is fit. Some kinds root freely in either young or ripened wood, other kinds will only strike in very young wood, and others only in ripened wood. From Christmas to April may be considered as good a time as any to put in most kinds of cuttings, as they root more freely before the weather gets too warm; but some kinds require to be put in every week throughout the year. No leaves should be taken off or shortened, except on the part that is buried in the ground, when the closer to the stem they are taken off the better. The more leaves a cutting has on it, the sooner it will root, though the majority of propagators trim up these cuttings like a parcel of naked sticks, which is the very reason of their not succeeding. The shallower cuttings are put in the pots the better the root, if they be but well fastened; if planted deep they are more likely to rot or damp off; the sand or mould in which they are planted must be kept moist, but not too wet, and the glass must be wiped occasionally, for too much moisture on them will make the cuttings turn mouldy, and rot off, even after they are rooted. When the young plants are rooted, the sooner they are potted off the better, in as small pots as they can safely be got into; for, if left too long in the cutting pots, the sand is apt to injure their roots. When they are first potted, they should be kept under a close glass for a few days, or in a frame on a gentle hot-bed, and shaded from the sun with a mat till they have taken fresh root, (this last is particularly applicable to cuttings of stove plants,) then harden them to the air by degrees. When the young plants are drawn up too slender, their tops should be pinched off. which will make them grow bushy. It is always best to top plants when young, if wanted to make them grow 'bushy;' if left to run up high, the knife must be used, which causes a wound that sometimes is unsightly. No leaves should be taken off the plants in this state, except decayed ones, for it weakens them very much.—Taking off a large leaf from a young plant will generally kill it, a circumstance," as Mr. Sweet observes, "with which few cultivators are acquainted."

The majority of shrubby plants will increase by cuttings of the branches, although there be exceptions to this rule in some of the species of *Acacia*, and some others, when cuttings of the roots are made use of as substitutes; and some species of plants, which are generally easily propagated, such as *Pelargonium*, require the same means of propagation, of which *P. triste, gibbosum*, and some others, may serve as examples. Some numerous families, such as *Erica*,

are, for the most part, propagated from cuttings of the young wood, and the remainder from seed. * * * * *

The whole process of propagation by cuttings, requires a deal of nicety in the operation, as well as a constant care during the whole process; and though long practised upon such plants as the willow, the vine, and many others, which must have been pointed out to man by Nature soon after his creation, it was, however, so little known when applied to delicate exotics, that fifty years ago, even in this country, it was scarcely known but to a few of the most eminent gardeners. Upon the subject of propagating by cuttings, as it may be supposed to interest a great part of our readers, the following extracts from that valuable work, the Encyclopædia of Gardening, may be both interesting and useful:—"In respect to the choice of cuttings, those branches of trees and shrubs which are thrown out nearest the ground, and especially such as recline, or nearly so, on the earth's surface, have always the greatest tendency to produce roots. Even the branches of resinous trees, which are extremely difficult to propagate by cuttings, when reclining on the ground, if accidentally or otherwise covered with earth on any part, will there often throw out roots, and the extremity of the lateral shoots will assume the character of a main-stem, as may be sometimes seen in the larch, spruce, and silver fir. Cuttings then are to be chosen from the side-shoots of plants rather than from their summits or main-stems, and the strength and health of side-shoots being equal, those nearest the ground should be preferred. The proper time for taking cuttings from the mother plant is when the sap is in full motion, in order that, returning by the bark, it may form a callous or protruding ring of granular substance between the bark and wood, whence the roots proceed. As this callous, or ring of spongy matter is generally best formed in ripened wood, the cutting, when taken from the mother-plant, should contain a part of the former year, or in plants which grow twice a year, of the wood of the former growth, or in the case of plants, that are continually growing as most evergreen exotics, such wood as has begun to ripen or assume a brownish colour. This is the true principle of the choice of cuttings as to time; but there are many sorts of trees, as willow, elder, &c., the cuttings of which will grow almost at any season, and even if removed from the mother-plant in winter, when the sap is comparatively at rest. In these and other trees, the principle of life seems so strong and so universally diffused over the vegetable, that very little care is requisite for their propagation. Cuttings from herbaceous plants are chiefly chosen from the low growths which do not indicate a tendency to blossom; but they will also succeed in many cases when taken from the flower-stem, and some rare sorts are so propagated." The leaves of some plants, especially such as are succulent, will form plants, such as *Bryophyl-*

lum Hoya, &c., and the late Professor Thouin observes, that the same may be stated of certain flowers and fruits.

In the case of plants which do not readily protrude roots by cuttings, artificial means are sometimes made use of to induce this disposition in them; several curious notices have appeared in the transactions of Horticultural Societies upon this subject. Ringing the cutting, that is, if a piece of the bark in form of a ring be removed off the cutting previously to its separation from the mother-plant, a callous will be formed, which will readily emit roots when taken off and planted in the ground; and it has been conjectured that a ligature would operate in a similar manner, though not so effectually, if made to encircle the shoots destined for a cutting, and should be taken off when an accumulation of sap has apparently been produced. In either case, the cutting should be amputated below the circles, and the cuttings should be planted so as to have the callous covered with mould.

The situation and position of cuttings, when placed in the pots, form no unimportant part of the process of propagating. By this means many kinds of cuttings will strike roots, when planted so close to the edge of the pot as to come completely in contact with it, that would not succeed if planted ever so carefully towards the middle of the pot; and others, when planted in the earth, will seldom, if ever, throw out any roots, but will most readily, if so planted that their base or lower end touch the bottom of the pot. This has been exemplified by a correspondent in the Horticultural Society transactions, in the case of eleven cuttings of oranges out of thirteen, which he rooted by this method, and afterwards by placing them in a moist heat. Some cuttings will root freely, when so placed in a pot of sand, that either their sides touch the sides of the pot for their whole length, or their lower end come in contact with the broken potsherds or pebbles with which it is drained.

A friend of ours has succeeded in striking pots full of *Ericas* by selecting the bottom of a flower-pot, and so placing it within the pot for the cuttings, that the lower ends of all the cuttings touched the buried part of the pot, the cuttings being planted in pure sand.

[To be Continued.]

THE ORCHARD.

ORCHARDS AROUND FARM HOUSES.

It is expedient that every farm should have some portion of orchard ground attached to it. The most convenient and guarded situation for it is immediately behind the house, so that the back kitchen door may open into it. It matters not whether it be on the north or any other side of the buildings. Many think that an orchard should be in a low sheltered spot, but this is a serious mistake. Fruit trees succeed best on a moderately high and open situation. Shelter from wind is certainly necessary, but this pro-

tection must be obtained otherwise than by planting in a dell. A deep mellow loam is most suitable for an orchard. It does not require to be richly manured, provided it is fresh, unexhausted and sufficiety dry. Whether the sub-soil be gravel or stony, provided such beds lie not too near the surface, it will be no detriment to the trees; but if of a tenacious clay which is retentive of moisture, then draining must be resorted to, in order to free the soil from superfluous moisture. This must be done effectually, otherwise it will ever be a subject of regret to the planter. A sloping surface is better for all plants than a dead level, not because a heavy or long continued rain or melted snow runs off the sooner, but because that portion of it which sinks into the ground gradually passes downwards in an under current, leaving no portion to stagnate in any one place, and to become prejudicial to the roots. The most profitable kind of orchard is that which contains all kinds of hardy fruit trees and bushes, and where the land is solely appropriated to that purpose.

METHOD OF PREVENTING THE CURCULIO AND OTHER INSECTS, FROM CLIMBING FRUIT TREES.

I SEND you an extract from a late English paper. It seems well worthy of attention, and may very possibly furnish a better antidote to the *curculio* than has yet been discovered. It will be necessary to make the bands broader and larger than is proposed in the paper below, and to use a much larger quantity of the prepation. If, as the discoverer asserts, the substance retains its viscidity for a considerable length of time, it will doubtless be found much less troublesome and expensive than tar. Some experiments I have made promise well. Care must be taken not to burn the India rubber in the house, as an exceedingly fine dust is produced, which spreads throughout the room.

To prevent insects from climbing up fruit trees.—At a late meeting of the Entomological Society, Mr. J. H. Fennell communicated the following successful mode of preventing insects ascending the trunks of fruit trees:—Let a piece of India rubber be burnt over a gallipot, into which it will gradually drop in the condition of a thick viscid juice, which state, it appears, it will always retain; for Mr. Fennell has, at the present time, some which has been melted more than a year, and has been exposed to all weathers, without undergoing the slightest change. Having melted the India rubber, let a piece of cord or worsted be smeared with it, and then tied several times round the trunk. The melted substance is so very sticky, that the insects will be prevented, and generally captured, in their attempts to pass it over. A small quantity of India rubber is sufficient for the protection of twenty ordinary sized fruit trees.—*Magazine of Horticulture.*

W. Cambridge, Dec., 1840.

MISCELLANEOUS DOMESTIC RECEIPTS.

Mode of Cleaning Floor-cloths.—First sweep the floor-cloth with a broom, then rub it with a damp flannel. When this is done, wet the floor-cloth with a little milk, and rub it with a dry cloth until it has a bright polish. A waxed flannel, which is generally used, renders the floor-cloth sticky, and makes it collect the dirt and dust, which is not the case when milk is used instead, in the manner above described; whilst the polish on the milk is even more brilliant than that on the wax.—*Magazine of Domestic Economy.*

Composition for Restoring Scorched Linen.—Boil to a good consistency in half a pint of vinegar, two ounces of fuller's earth, an ounce of hen's dung, half an ounce of yellow soap, and the juice of two onions. Spread this composition over the scorched part; and if the threads are not actually burnt through, it will remove all traces of the scorching, and the linen appear as white and perfect as before the accident. The composition must dry upon the linen, which will, perhaps, require a couple of washings before all traces of the scorching disappear.—*Ibid.*

Essence of Soap for Shaving.—Rub well in a marble mortar an ounce of Castile soap with two drachms of salt of tartar. Add by degrees half a pint of fine lavender water, with two grains of camphor dissolved in it. When the whole is well incorporated together, filter it, and keep it in closely-stopped bottles. For use, put ten drops into a small wineglassful of water; dip the shaving-brush into the water, and by rubbing it on the face, a fine lather will be immediately obtained.—*Ibid.*

Cure for the Headache.—Mr. Thomson, a traveller in Mexico, describes an efficacious remedy used there for the head-ache, and also for the tooth-ache. The head must be bent down on the side from which the pain proceeds, whilst a spoonful of rum or any other spirit is introduced into the opposite ear. The patient should then remain quiet till the pain subsides, which is usually in three or four minutes.

The sensation is not disagreeable, resembling the stunning produced by plunging the head in water. Muleteers generally put rum in the ears of their mules when they have a *coup-de-soleil.*

The relief thus experienced is caused by evaporation, which produces cold and checks the circulation in the afflicted part. Eau de Cologne, and æther, have an equally rapid and powerful effect.—*Ibid.*

Girambing; a new French Beverage.—Boil four ounces and a half of powdered ginger in fourteen quarts of water, wine measure. Then beat up four whites of eggs to a froth, and mix them together with nine pounds of white sugar in the preceding. Then take nine lemons and peal them carefully, add the juice and the rind to the foregoing ingredients. Put the whole into a barrel; add three tablespoonfuls of yeast. Bung down the barrel, and in about twelve days bottle it off; in fifteen days it will be fit for drinking, but it improves by keeping.—*Ibid.*

To Distinguish good Mushrooms from bad.—Take half an onion stripped of external skin, and boil it with the mushrooms. If the colour of the onion is changed and it becomes bluish or tinged with black, it is an evident sign that poisonous fungi are mixed with the mushrooms. If the onion preserves its colour, there is no danger.—*Ibid.*

Scented Oil.—Saturate some fine cotton wool with the purest olive oil, and spread it, with alternate layers of jessamine flowers, in a jar or other vessel. In a few days the flowers will have imparted the whole of their perfume to the cotton. The oil may then be pressed out, and kept in a bottle for use, and the cotton will serve to perfume drawers or wardrobes.—*Ibid.*

For a Sore Throat.—A quarter of an ounce of finely pulverized nitre should be mixed with three ounces of pure honey. This mixture, if used as a gargle, will be found very efficacious.—*Ibid.*

GARDENER'S CALENDAR FOR JANUARY.

VEGETABLE GARDEN.

Sow Peas, Beans, Cabbages, Cauliflowers, Beets, Carrots, Salsafy, Parsnips, Lettuce, Radishes, Turnips, Spinage, Onions, Leeks, Asparagus, Artichokes, Parsley, Pot and Medicinal Herbs, Small Salading. Plant Irish Potatoes, Onion Sets, Garlick, Shallots, Jerusalem Artichoke and Horse-radish. Transplant Cabbages, Cauliflowers, Brocoli, Lettuce. Earth up Celery and Endive.

Peas.—The principal crop should now be sown, if not done in December. The best varieties for an early crop are the Extra Early Dwarf, Cedo Nulli, Early Warwick, Bishop's Dwarf. This last is best suited for town-gardens, where Sticks cannot be had. For successional crops, sow the Dwarf Marrowfat, Blue Scymetar, Knight's *Dwarf* Marrowfat, *(one of the very best varieties,)* Blue Prussian or Green Imperial. Any of the varieties of Cabbages may be sown, but the early are to be preferred at this season. The Spring Cauliflower should be selected for this sowing.

Only a few of Beets, Carrots, Parsnips, Salsafy, and Turnips, should be sown this month, as they are all very tender whilst young, and consequently easily killed. Should there be any severe weather, they should be protected by some light covering. The Lettuces, Cabbages and Radishes, should also be protected; the last may be sown between rows of Carrots or among Spinach. The latter should be sown twice during the month. Cellery should be earthed up during dry weather as often as required, which will be at least once a fortnight. Endive should be tied up for bleaching. It is late to dress Artichokes and Asparagus beds, but if not done before, they had better be now attended to. The Irish Potatoes planted in the commencement of this month, may have their tops killed by frosts in February, but they will not be injured by it; towards the last of the month they may be planted for a general crop.

THE FLOWER GARDEN.

The principal work in the flower-garden, this month, will be the planting of bulbs, such as Tulips, Hyacinths, Crocuses, where none have been planted before. It is not a proper season for these, as they ought to have been put in, in October and November. They will, however, still succeed, but not bloom as freely.

Ranunculus' and Anemonies' may also be planted, if not done in the previous months, they should receive protection in cold weather.

Some of the hardy annuals, as Larkspurs, Poppys, Ten Week Stocks, &c. may be ventured, though it would have been better to have made a sowing in September or October, and if omitted then, it will perhaps be best to wait until February. A few of both the tender, half-hardy and hardy annuals may be sown in pots, which may either be plunged in a hot-bed or kept in a green-house or sitting-room; these may be turned out into the open ground in March. Dahlia seeds may also be sown, and the old roots planted. When wanted to bloom early they may be potted, and either plunged into a hot bed or placed in a warm situation in the green-house.

Rose trees, and other flowering shrubs, should be pruned, and transplanted, where required.———Many of the green-house plants towards the last of the month will requre re-potting. This should be done before they commence their new growth.

ORCHARD.

This is a good month for planting out Fruit trees, and making new orchards, as well as planting out Grape vines Fruit trees and vines should also be pruned, and the latter trained regularly over the arbors or trellises which are to support them.